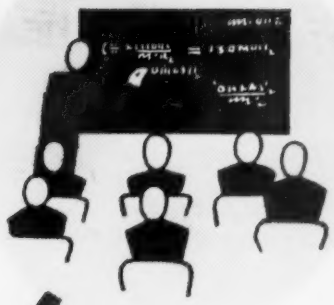
APRIL, 1955

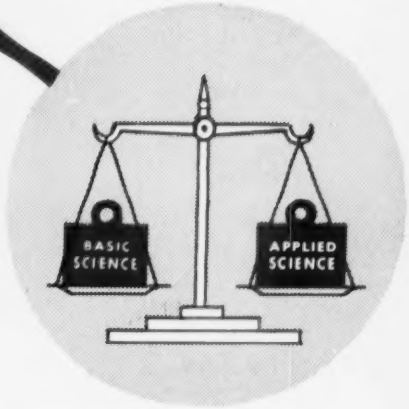
American Engineer

IN THIS ISSUE . . .

- **A 4-POINT PROGRAM FOR TECHNOLOGICAL VIGOR**

By
Dr. James R. Killian, Jr.
President, Massachusetts Institute of Technology





Dr. Killian, above, offers his suggestions for maintaining U. S. leadership.

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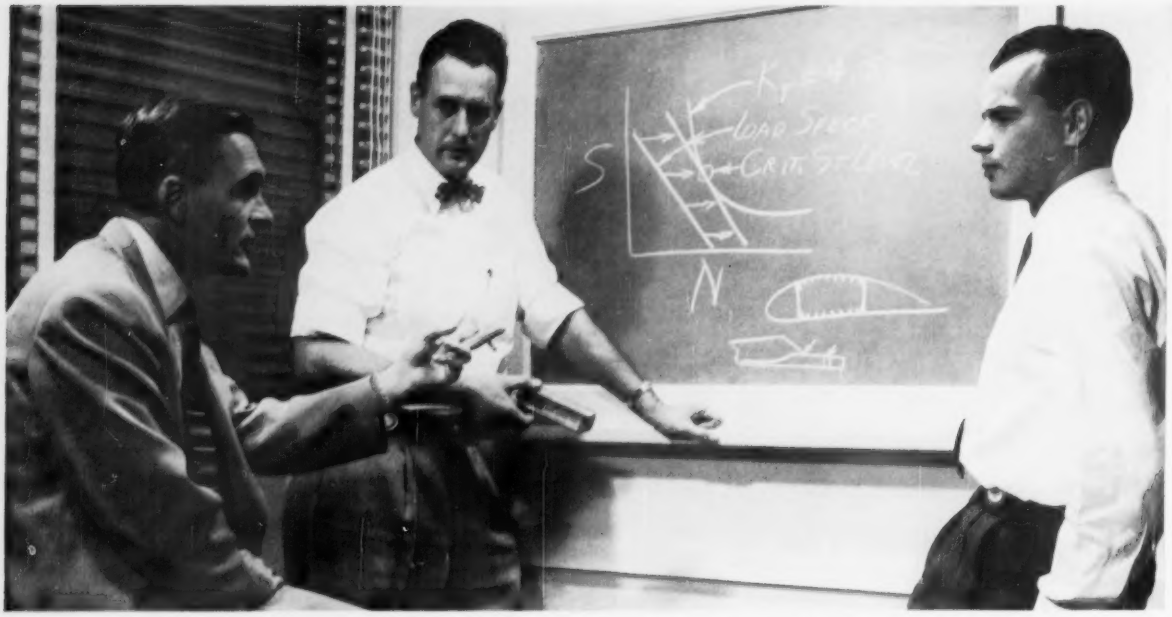
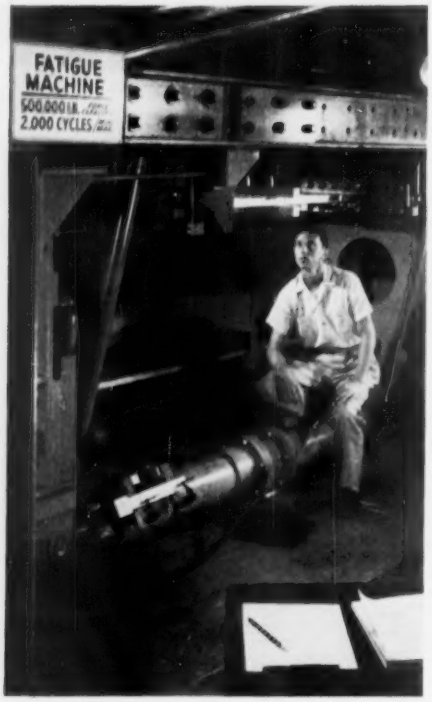
- The Engineer As An Arbitrator
- Special Report on Industrial Safety
- 1955 Engineers' Week Roundup
- News of Society Activities



J. F. McBrearty, chief structures engineer (left), discusses fatigue test program of integrally-stiffened wing lower surface structure of Super Constellation Model with E. H. Spaulding, structures division engineer and J. G. Leewolt, stress engineer. Lockheed's 500,000 lb. Force Fatigue Machine was used in test program.

Advanced structures facilities speed careers of Lockheed Engineers



Ralph Oliva, research engineer, examines Super Constellation skin for signs of fatigue failure.

Engineers in Lockheed's Structures Division are supported by unmatched research and testing facilities in their constant effort to increase strength while decreasing weight.

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Engineers interested in the "Fail-Safe" program and other studies are invited to write E. W. Des Lauriers, Dept. S-2-4.

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American Engineer

APRIL

1955

American Engineer
21st YEAR OF PUBLICATION
1934 — 1955

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•

Perhaps there has been no time in the history of the engineering profession when its opportunities have been greater, its responsibilities more exacting, its need for self appraisal and professional statesmanship more urgent.

—Dr. James R. Killian, Jr.
President, Massachusetts Institute of Technology.

•

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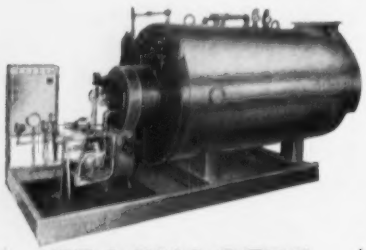

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Letters to the Editor

Corporate Practice . . .

Dear Editor:

. . . The report on the Washington, D. C. case on page 27 (AE, February, 1955) is a major milestone in our history. While many of our members may miss the ramifications of this decision, it points to the roots in which our profession is founded and is a case against the practice of engineering by corporations in any state. . . .

JOHN R. QUINZIO, P. E.,
N. Tonawanda, N. Y.

More Corporate Practice . . .

Dear Editor:

Are we undergoing a transition in our social, economic, and professional setup? Let us look into a crystal ball:

A group of "business" men with "unemployed" capital decide there is a good field for profit in providing medical services on a large scale. They organize "Presto Healing Services, Inc.," provide the capital to build a hospital, hire a licensed M.D. to be in charge, *incorporate*, and go into "business." Your health is in their hands—(or their competitors!)

. . . another group of "business" men note the increasing activity to unravel human problems and conflicts. They organize "Presto Counsel Services, Inc.," furnish impressive offices, hire a registered counselor-at-law (who hires a staff at least cost to the owners), and the firm proceeds to act for divorce seekers, debt collectors, etc., with a special staff of "ambulance chasers," to serve all who seek redress or defense in the courts of law. Your legal rights are in their hands—(or their competitors!)

Fantastic? There is good precedent, for down the street is the newly organized "—Engineering Service, Inc.," promoted by a group of "business" men who have secured the services of one licensed engineer to appear on the company payrolls with the title of Vice President. He hires the cheapest "technical" labor he can get to serve the public needs in design and construction. Your convenience and safety are in *their* hands.

Engineers! Reread and digest "Corporate Professional Practice vs. Individual Professional Practice" (AE, January, 1955). You have a simple choice: Either prepare to protect your professional entity and individuality, or surrender and forget your license, your education, your hard won experience, your professional integrity and conscience, and go into some other line where ability to "make a fast buck" is the criterion of "success."

ERIC FLEMING, P. E.,
New Brunswick, N. J.

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Techneer? . . .

Dear Editor:

There is a continuing interest in the possibility that there may be—or be devised—some terminology that will definitely separate in the layman's mind a technical professional engineer from other practitioners of activities who may erroneously be termed engineers.

Recently there has been the suggestion that "progineer" be adopted. Should this not be considered *too* long, it still suggests a *practicing* professional engineer, while we all know that a very high percentage of registered engineers are merely *potential* professional engineers.

I would like to suggest consideration of another term. Whatever else we may be—actually or potentially—it is certain that anyone who is registered as an engineer, is a *technical* engineer in one or more specialized fields. Now, obviously "Technical Engineer" is too long to use as a title, either before or after one's name, fully descriptive, though it may be.

One of our very commonly exercised American traits is to abbreviate whenever possible—abbreviations of long titles and terms reduced to the initials of the component words. Abbreviations of shorter titles and terms are more often contractions. It is such a contraction that is here suggested. Suppose we take the fully descriptive term, "Technical Engineer," and contract it, using only the first and last syllables. It then becomes "Techneer" (pronounced as though spelled Techner or Tekner). Now this, too, is descriptive, short (rhymes closely with doctor) and easy to use both before or after one's name. Abbreviated still further to Tr., it may be used as a written or spoken title (Tr. Jones, etc.). It may be copyrighted by NSPE and bestowed by them on all who meet determined requirements (graduation with a suitable degree, registration, or whatever) *whether members of NSPE or not.*

In the future it may be found desirable to extend the use of Techneer, modifying it by another specified term. For example, the name B. A. Jones, C. T., would be an abbreviation for B. A. Jones, Civil Techneer. He would still be addressed as Techneer Jones orally.

I believe that "Techneer" can be quickly popularized and its use become general if it meets with NSPE's approval and its use properly and vigorously promoted by them.

R. A. MERRELL, P. E.,
Chattanooga, Tenn.

Dr. Eng.? . . .

Dear Editor:

. . . To the public generally the name "engineer" conjures the image of a man in khaki, long boots, with a surveyor's instrument, and perhaps a slide rule; or

(*Continued on page 40*)

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PROFESSIONAL NEWS IN CAPSULE FORM

A Roundup of Late Events for Professional Engineers

Higher Salaries Necessary Says Mining Engineer

H. DeWitt Smith, new president of the American Institute of Mining and Metallurgical Engineers, has warned the mining industry that it must pay higher salaries if it wants to avoid a serious shortage of engineers.

"It is up to the mining companies to make financial remuneration and opportunities for advancement more attractive if mining is to keep the technical people it has and attract the young men it urgently needs," he told the Institute's members during their recent annual meeting. "Many companies," he continued, "are still paying 1945-sized salaries, yet the scale of living for mining engineers and everybody else has changed considerably from 1945 to 1955."

Mr. Smith pointed out that the seriousness of the problem was highlighted by the fact that only 300 new mining engineers were graduated last year and only half that many will be graduated in 1956. Seventeen of twenty-nine accredited schools graduated fewer than ten mining engineers last year, he said.

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Whitney Is Concrete Prexy

Charles S. Whitney, partner in the consulting engineering firm of Ammann and Whitney, New York and Milwaukee, was recently elected president of the American Concrete Institute during the organization's 51st annual convention held at the Hotel Shroeder in Milwaukee. Mr. Whitney, who is also a member of the Wisconsin SPE and NSPE, succeeds another NSPE member, Professor Charles H. Scholer of Kansas State College, in the top office for the concrete men.

A graduate of Cornell University with both C. E. and M.C.E. degrees, Mr. Whitney is well known for his contributions to reinforced concrete design, particularly in shell construction and other arched structures and ultimate load design.

Walter H. Price, head of the U. S. Bureau of Reclamation's Denver engineering laboratories, was elected for a two-year term as vice president of the Institute; while Frank Kerekes, dean of the academic program, Michigan College of Mining and Technology, who was elected to a two-year term in 1954, continues in a vice presidency.

"I hate to disagree with you, gentlemen, but while that metal you mention has advantages, cost and corrosion factors present problems that cannot be overlooked."

Detroit Tech Names Engineering Dean

Captain William A. Hickey, USN (Ret.), has been appointed dean of the Engineering College of the Detroit Institute of Technology, according to a recent announcement. His appointment follows the retirement of Dean Clarence C. Winn, who was made dean emeritus after holding the office for 31 years.

Captain Hickey was most recently supervising inspector of naval material, Central District, U.S., with headquarters in Chicago. He is a graduate of the U. S. Naval Academy, from which he received a B.S. in engineering, and of the University of California at Berkeley, where he earned an M.S. in petroleum engineering.

Higbee Elected by Surveyors

Lester C. Higbee, a well-known member of the New York State Society of Professional Engineers and NSPE, has been elected president of the American Congress on Surveying and Mapping. His accession to the top post was announced during the Society's annual meeting held in Washington, D. C., March 9-11.

Mr. Higbee, who is a civil engineering graduate of the Rensselaer Polytechnic Institute, is president of W. & L. E. Gurley, engineering and scientific instrument manufacturers of Troy, N. Y.

Experiment at Rensselaer

Rensselaer Polytechnic Institute, Troy, New York, has announced an "experiment in education" which will be conducted next summer under the aegis of its Department

of Metallurgical Engineering.

Participating in the "experiment" will be twenty-five students carefully selected from the junior classes of major accredited engineering colleges on the basis of highest talent and promise in science and engineering. They will be given work on graduate levels "to demonstrate whether students of their quality, without senior training can successfully cope with graduate subjects."

The students will be taught by the top men at R.P.I. and by cooperating scientists from the research laboratory of the General Electric Company at Schenectady. The program will run for six weeks and will consist of two concurrent courses—one dealing with the modern physical chemistry of metals, and the other with modern metal physics. Dr. Arthur A. Burr, chairman of the Metallurgical Engineering Department, said the courses, which will make the successful participants eligible for the same academic credits that would normally result from a full semester course of seventeen weeks, were designed generally for students majoring in metallurgical engineering, chemical engineering, chemistry, and physics.

❁

H. N. Loomis on Connecticut Board

Henry N. Loomis of Hartford, a well-known member of the Connecticut SPE, has been named to the Connecticut State Board of Registration for Professional Engineers and Land Surveyors by Governor Abraham Ribicoff. Mr. Loomis succeeds the late F. L. Castleman who was also dean of engineering at Connecticut University.

❁

Ryder Recommends Ways to Gain Students

Speaking at the recent Southwestern Institute of Radio Engineers Conference in Dallas, Dr. J. D. Ryder, president of the Institute of Radio Engineers, offered two recommendations to solve the dual problem of getting students interested in engineering and providing them with a well-rounded education when they enter the field.

Dr. Ryder, who is also dean of the School of Engineering at Michigan

(*Continued on page 8*)

HALF the world is half asleep! Men who could be making *twice* their present salaries are coasting along, hoping for promotions but doing nothing to bring themselves forcefully to the attention of management.

They're *wasting* the most fruitful years of their business lives . . . throwing away thousands of dollars they may never be able to make up. And, oddly enough, they don't realize—even remotely—the tragic consequences of their failure to forge ahead while time is still on their side.

These are the men who are unknowingly headed for the frustrations and the disappointments of mediocrity. They'll go part way up the ladder and down again by the time they're fifty years old. They'll be executive material in their twenties and thirties—and clerks in their fifties. They'll have high hopes for themselves and their families while they're young; but only struggling, skimping and regret later on when their earning power should be at its height.

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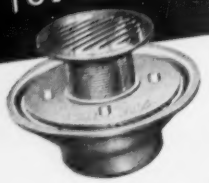

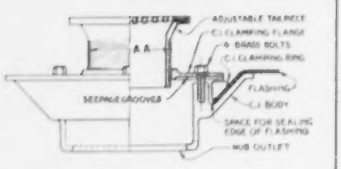

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Briefs

(Continued from page 7)

State College, suggested that: (1) It should be emphasized to high school math and science teachers that their jobs are vitally important and that they can, if they perform them well, influence appropriately talented students to enter the engineering and scientific fields; and (2) Engineering college curricula should be expanded to give badly needed courses in the liberal arts and other non-scientific fields.

⚙

Fulbright Urges Humanities Study

Senator J. William Fulbright, who is also a former president of the University of Arkansas, has urged that more attention be paid to the humanities in institutions of higher learning. Speaking in Chicago on March 2 at the conference of the Association for Higher Education, the Senator scored a dangerous neglect of the humanities in favor of over-emphasis on technical specialization, and stated that he felt that democracy itself is being weakened as a result.

Although the country needs scientists and technicians, he said, it also needs well-educated men and women who can think clearly on the serious problems confronting the Nation. "Specialization," Senator Fulbright stated, "does not create an atmosphere in which the mind can be opened to every intimate impulse and voice, meshed with other minds of a like sort." By definition, he pointed out, specialization "focuses on only a small part of the human battle line. It orients no one toward the whole intellectual life and tradition of a country."

He recommended that the humanities be restored to a more important place in the colleges of the country.

⚙

Pratt Expands Curriculum

The Pratt Institute's School of Engineering, Brooklyn, N. Y., has announced that starting next September it will offer major sequences in chemistry and in industrial engineering. These new major courses will be added to those in chemical, electrical, and mechanical engineering which have been regularly offered.

New Test for Engineers

Marvin D. Dunnette of the University of Minnesota's Industrial Relations Center has developed a new test designed to help engineers find their most appropriate job type and to aid engineering managers in discovering promising new engineering talent. Termed the "Minnesota Engineering Analogies Test," the examination can be used, it is said, either to measure engineering effectiveness or to identify a man's potential for specific engineering fields.

⚙

Dean Arm Resigns

Dr. John A. Perkins, president of the University of Delaware, has recently announced the resignation of David L. Arm, dean of the University's School of Engineering.

Dean Arm, who is a member of the Delaware Society of Professional Engineers and NSPE, has been a member of the Delaware faculty since 1946. During World War II, he was director of the U. S. Navy Diesel School at Iowa State College.

He now plans to move to Chicago where he will become manager of the Industrial Department of the National Safety Council.

⚙

Friel Heads Consulting Engineers

Francis S. Friel, president of Albright & Friel, Inc., of Philadelphia and a well-known member of the Pennsylvania SPE and NSPE, has been elected 1955 president of the American Institute of Consulting Engineers.

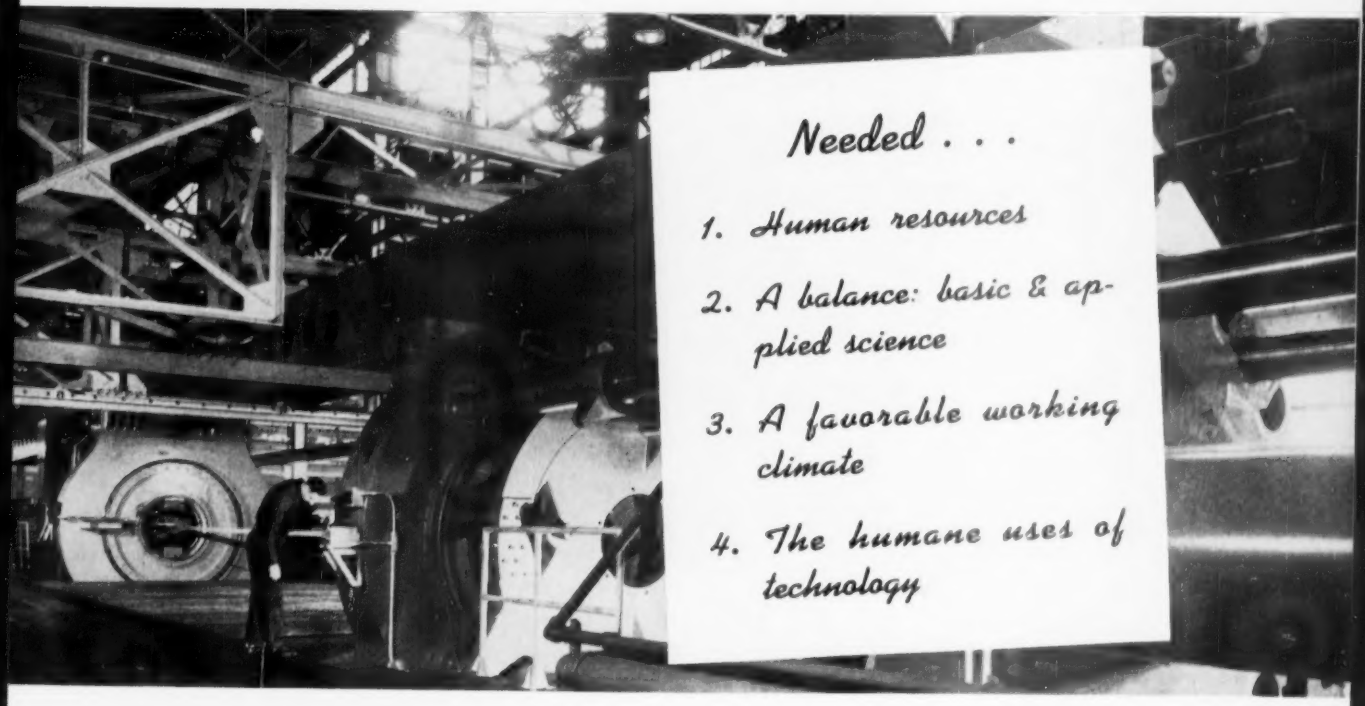
Other new officers elected at the recent meeting of the AICE Council in New York are: Clinton D. Hanover, Jr., of Hardesty & Hanover, New York, and Carlton S. Proctor of Moran, Proctor, Mueser & Rutledge, New York, vice presidents; T. T. McCrosky, an independent New York consultant, secretary; and George C. Diehl, also of New York City, treasurer.

Members of the AICE Council, newly elected to serve until 1958, are: Edward H. Anson, senior vice president of Gibbs & Hill, Inc., New York; Harland Bartholomew of Harland Bartholomew & Associates, St. Louis; and Gilmore D. Clarke of Clarke & Rapuano, New York. Mr. Bartholomew and Mr. Clarke are also members of NSPE.

American Engineer

The Magazine of the Registered Professional Engineer

VOLUME TWENTY-FIVE, NUMBER FOUR


Needed . . .
1. Human resources
2. A balance: basic & applied science
3. A favorable working climate
4. The humane uses of technology

A 4-Point Program for Technological Vigor

By

DR. JAMES R. KILLIAN, JR.,

President, Massachusetts Institute of Technology

As a partner of the scientist and industrialist, the engineer is one of the chief architects of our flourishing technological society. His responsibility becomes steadily greater for its state of health and its advancement. The professional competence and insight expected of the engineer, and his grasp of the social forces he affects and is influenced by, all become greater as our society becomes more complex and as our Nation assumes greater responsibility and faces greater hazards. Perhaps there has been no time in the history of the engineering profession when its opportunities have been greater, its responsibilities more exacting, its need for self appraisal and professional statesmanship more urgent.

All of these increasing obligations of the engineer I wish to touch upon, but to do so in the context of *technology*, which I define as the combination of science, engineering, and industry for the accomplishment of useful social ends. It has been the effective combination of these three powerful activities which has been one of the major achievements and special characteristics of our American society.

In his provocative book, *The Taming of the Nations*, Professor F. S. C. Northrop has developed the thesis that American skill in putting nature to work for the benefit of man has given our society and its form of benevolent capitalism a stability and a character unique to the United States. This technological drive has been profoundly influential in making possible our fluid, classless society. To an extent greater than any other nation,

Human Resources. . .

If our technological machine is to operate as it should, the author reminds us that we must have the necessary human resources, properly educated. Photos on these two pages show engineers at work in widely diverse fields. At left: Grumman Aircraft engineers puzzle over a problem. Below: Chemical engineers at Columbia Chemical Company scan a new plant layout. Opposite page: Raytheon Manufacturing Company engineers, who deal in electronics, study a new device.

we have discovered that we can wrest from nature a range of benefits that has largely removed the temptation to try ideological nostrums.

The continuing American revolution is the revolution of man against things as they are when there are ways of doing things better. It is a revolution based upon determination rather than determinism. It is a revolution based upon creating wealth from nature rather than taking it away from other men. Its fight is against ignorance and helplessness when there is so much that needs to be done to enable men and women to lead richer, fuller, and more satisfying lives. It is a revolution against all the forces which hinder man in building a better life.

BUT recognition of the contributions which technology makes to our national welfare is not enough. We must make sure we plan intelligently to maintain the vigor of that technology and that we combat the forces which would retard its advance. I would like to suggest a four-point program for maintaining the vigor of our industrial technology.

First, we must provide the necessary human resources, properly educated, and we have little reason to be relaxed or complacent about our own supply of professional manpower. As Ray Bruner has so well described in his series of articles in the Toledo, Ohio, *Blade*, we face currently a scarcity of scientists and engineers. We have a shortage of science teachers in our secondary schools, and an impending critical scarcity of teachers of all kinds in our public schools.

We are in process of having our national school enrollment double with a consequent shortage of classrooms running into hundreds of thousands. Because of the shortage of teachers and their inadequate status and compensation, we will have the greatest difficulty in preventing a wave of mediocrity engulfing our schools. If we let our standards drop while our enrollments on through college go up, we face the possibility of a flood of college graduates inadequately educated but no less expectant of all the economic opportunities commonly expected by college men.

We hear forecasts that our college enrollments may be nearly doubled by 1970, but we do not always pause to analyze what this doubled enrollment means in terms of additional manpower of a quality essential for professional careers. Even though we experience the great increase in enrollment anticipated, it could be that the number of graduates qualified for professional careers of high creative accomplishment may not increase enough to prevent a scarcity in meeting the manpower needs of all of the many professions required by our society.

Dael Wolfle in his book, *America's Resources of Specialized Talent*, points up the possible limitations we face in greatly expanding the number of scientists, engineers, doctors, teachers, and other professionals.

"Of the top two per cent of high school graduates, currently about two-thirds now graduate from college; of the top 16 per cent, about half now graduate from college; of the top 50 per cent, about a third now graduate from college. Wherever one cares to draw a line separating the superior college prospects from the mediocre and inferior ones, it is evident that we might have more average and better college graduates than we now do. But the possible increase is limited. We might increase the number by 50 per cent; we might double the number; with more lenient standards we might more than double it. But that is as far as we can go. We could not increase the number by a factor of 5 or a factor of 10."

This limitation on the number of highly qualified young people points up again the importance of the secondary school teacher. As Wolfle points out, to increase the percentage of highly qualified college graduates will require the early identification and encouragement of bright students, and this means spotting and helping them as early as the ninth grade. One of the greatest challenges the American people face in the second half of the twentieth century is the problem of giving our teachers the incentives, the awards, the social

status which will enable us to educate our young people to realize their full potential and to identify and push ahead those who are endowed with creative intelligence.

Turning again to the current scarcity of scientists and engineers, I would like to examine our position vis-a-vis Russia, now so much under discussion. There is a hazard that these comparisons might lead us to wrong conclusions. Recent studies indicate that the total output of scientists and engineers from the educational institutions in Russia stood at about 100,000 in 1953 compared to 80,000 in the United States. If we project the trends in the two countries, it would appear that by 1960 the Russians will be training about twice as many scientists and engineers as the United States. Of the total output in Russia in all fields, about 44 per cent are in science and engineering, while the comparable percentage in the United States is 28. The total number of graduates in major scientific fields in Russia—about 1,100,000—is about the same as the total number in the United States. In Russia, the total number holding the equivalent of Ph.D. degrees in scientific fields is 50,000. In the United States, the total holding doctor's degrees is 48,000.

CLEARLY the Russians attach great importance to education in the fields of science and engineering and clearly they recognize the importance of this education to the military power as well as the economic development of the country. The evidence indicates that the quality of Soviet education in these fields is good and that it is improving. With these comparative estimates before us, it is important that we draw the right conclusions from them. Clearly the United States has a problem in educating an adequate number of highly qualified scientists and engineers, and in most of the fields of the physical sciences and engineering, its output at present is insufficient. We have reached a new plateau in the United States in our need for specialists to do the increasingly complex work of our society. The increasingly complex technology used by industry, together with the defense requirements of the Nation, have created a new level of demand.

In meeting these increased needs, however, I think we should not do so on any basis of engaging in an academic numbers race with the Soviets. Our educational planning should be based upon the indigenous needs of the United States and it should be keyed not only to numbers but to quality. We do not yet know enough about the kind of engineers and scientists being educated in Russia to draw any significant conclusions beyond the safe one that they are probably good. There is evidence to indicate that the engineers whom they are training are highly specialized, whereas the trend in the United States is to provide a more fundamental education in these fields. In my judgment, we should continue to stress the more fundamental approach to the education of these professionals because I believe that this kind of education will contribute most importantly to our scientific and technological strength. Studies are now being initiated at my institution under a grant from the Carnegie Corporation to seek some light on the qualitative aspects of Russian education in science and engineering.

While we have a shortage in numbers, our most important problem is to maintain the quality of our education in these fields; and we should not forsake quality for the sake of numbers. The growth of graduate study in science and engineering in the United States, particularly that which has taken place since the war, is profoundly important in providing us the quality we need. We need still further to promote graduate study and strong graduate schools.

In engineering there are many special reasons that make it important for educational standards to be raised still higher and for more graduate study to be undertaken. I am greatly encouraged to perceive a growing spirit of innovation and experimentation in our engineering schools. In general, we have tended to be too conservative, too inflexible, too routine.

ONE of the most important current changes is the effort to broaden the base of engineering education. Our leading engineering schools no longer are content with training technicians. They see their opportunity and obligation to educate professional men for leadership.

In my judgment, a great school of engineering and technology must have first-rate science and first-rate general education if it is to have first-rate technology. We have an opportunity in our institutes of technology to create a new kind of university, a modern university

The author calls for a proper balance between basic and applied science. At left are shown Dr. C. Guy Suits, vice president of General Electric and director of research, with Drs. H. M. Strong, left, and H. Tracy Hall, right, successful pioneers in the search for diamond-making methods and formulae. Man-made diamonds, the crowning success for 125 years of effort to reproduce nature's most glamorous and hardest substance, have been produced by GE. See cut on opposite page.

built around science and social technology rather than classical studies, but embracing the arts, the social sciences, and the humanities as essential partners. With such a framework, it is possible to educate men and women who have the competence of specialists plus a sense of the first-rate which extends beyond their specialized interests.

I hold that nothing less will suffice for American engineering and American society than that our schools be competent to attract and educate those who can be great citizens as well as great specialists. This we have done in good measure already but we must do more.

The second point in my four-point program is the furtherance of a proper balance between basic and applied science. We must protect and extend our basic research as the seedbed of new advances.

CERTAIN forces at work today tend to favor applied research. The defense of the free world has imposed upon us a vast program of research and development for defense. Our Government now spends about two billion dollars a year on research and development, most of it for applied research and development relating to defense. In a period when the national security is in danger, a diversion from basic research on the part of all of our research organizations is necessary. We know that in the last war and during the present period, our universities have been called upon to do extensive applied research. This they must do in the national interest, but the necessity for doing it only points up the importance of stressing the protection of our basic research activities. The responsibility to do this rests not only upon our basic research institutions; it rests also upon industry and government to share in the responsibility of maintaining a vigorous program of basic research. This is far more than a matter of benevolent support of something good. It is a matter of survival and of enlightened self-interest.

Back of all industrial technology, stand the men who are the exemplars of disinterested curiosity pushing patiently ahead in their desire to understand the universe. This is pure research—fundamental research! Before there could be an atom bomb, there had to be a Thomson or an Einstein and a great army of other scholarly investigators. Before we could have penicillin, there had to be a Fleming. Before there could be the great computing machines, there had to be the hundreds of mathematicians and other scientists who laid the groundwork for the applied scientists and engineers.

The third section of my platform for technological progress has to do with maintaining a favorable climate for scientific and technological advance. We must, unhappily, recognize that there are certain forces at work today which tend to retard creative activities.

AS a result of the cold war, we have enforced upon us a burden of secrecy which, coupled with the necessity of combatting Communist infiltration and espionage, has forced upon us procedures and apprehensions we have never experienced before and which are abrasive to our spirit. Much of this secrecy is necessary, but it is also necessary not to let a preoccupation with secrecy become so rampant that it impedes our scientific progress.

I fear that we run the hazard of coming to feel that secrets are more important than keeping ahead and to lose sight of the fact that scientific advance flourishes best in an atmosphere free of undue conformity, suspicion, and secrecy. I do not minimize the importance of security and of maintaining the proper secrecy of our weapons; neither do I minimize the difficulties and complexities of protecting vital secrets in the present state of the world. But I do feel it vital that in the management of our security system we not forget that the one race the American people dare not lose is the race to keep ahead in our weapons development, our technology, and our science, and that this requires the fewest possible barriers for creative workers. These statements are all truisms, but truisms need to be restated and reiterated when they become neglected.

We also have reason for apprehension that recent events and attitudes in our country with respect to science and scientists may tend to discourage scientific advance. Representatives of science, industry, and government have a responsibility to minimize this discouragement. We must not let the controversies of the past weaken our national unity or deter our advance.

I find great encouragement in the successful efforts which have been made both by military personnel and civilians to insure effective relationships between the soldier and the scientist-engineer. Our national security depends upon an effective partnership between the military specialist and the technological specialist. Efforts to disturb this relationship are against the best interest of the Nation.

We in the field of science and engineering have a special need today to consider the position of the scientist and engineer in relation to public policy. There is some inclination to consider the scientist as so much of a specialist that he has no qualifications for speaking up on public policy. There is almost a hazard that the scientific and technological specialist will be muted as a voice in our public councils.

In an age of science and technology this is doubly unfortunate. Public policy needs to have from science an understanding of how science affects policy. And the scientist should have the same prerogative—no more, no less—than other professional men, lawyers, doctors, ministers, teachers. He also has the same obligation as do they to speak responsibly on public matters. But just because a man is a scientist or engineer should not disqualify him from speaking on an equal basis with other professional men in regard to the great questions of our day. The very nature of many of the questions, arising as they do out of the activities of scientists and engineers, makes it imperative that the scientist and engineer speak as citizens on an equal footing with citizens of comparable education from other walks of life. This is important if we are to maintain a favorable environment for technological advance and if the Nation is to deal wisely with the great technological forces of our time.

In terms of the special interests of research, this need for a favorable climate cannot be overemphasized. We have only to point to the fact that the research load of the Nation rests in the hands of a very small number of scientists and engineers; in fact, the basic research of the Nation is carried on by hardly more than 125,000 men and women. We can readily see how important it is both in industry and in non-profit institutions that these workers have an environment which is most conducive to creative activity.

If we maintain the proper climate and incentive for creative activity, the outlook is highly encouraging—not only for furthering our military technology, but for general advancements on many fronts. There is no foreseeable limit to this foward advance if we do not permit the water level of initiative and creativity to drop.

No one who has firsthand knowledge of what is going on in our research laboratories today has any doubt about this. Research is progressively developing expanding supplies of food, materials, and power. New primary sources of energy are being explored, most notably at present nuclear energy and solar energy. The first half of this century has seen a revolution brought about by the development of synthetic products by the chemical industry. These developments continue.

It is possible that electronics will provide the most revolutionary technological changes in the immediate future. The reader will understand the revolutionary impact of cybernetics, of information theory, and of the systems of automatic control and computation they and electronics have brought into being.

As the battle against infectious disease approaches a day of victory, attention is turning toward the study of old age and the degenerative diseases. These become increasingly important problems as advances in nutrition and medicine extend the span of life. Within the past two decades, life expectancy has been increased by about twenty years. During my lifetime more years have been added to the span of life than had been added in the preceding thousand years.

In short, the future promised by the present achievements of science and technology and industry is one of unlimited horizons if we can maintain a climate in which science and industry can flourish.

Implicit in all that I am writing about the necessity of a favorable climate is the development of a sound relationship between the layman and the expert. If science and research are to flourish, they must have the sympathetic backing of the layman; for, in the final analysis, it is the layman—the citizen—who will provide our support. He must be both an informed and a respected partner. He must be given the opportunity to understand that research and technology are among the most beneficially potent social forces of our time.

The fourth plank in my platform for an advancing industrial technology, therefore, is to stress the beneficent and humane uses of science and technology.

If American technology is to continue to prosper, if it is to continue to attract to it its proper complement of creative and gifted minds, we must everywhere combat the mistaken notion that science and technology are narrow, provincial, and destructive of human values. The record is clear that they are not, but the record isn't always understood. We must demonstrate that science and industrial technology are great liberalizing, humanizing forces.

In the face of the current turmoil involving scientists and engineers, we have an unusually urgent responsibility to stress the character of their work as a liberalizing, humanizing, and creative force that serves man spiritually as well as intellectually and practically. To achieve this result we must rely on teamwork and coalition of effort. Let me illustrate.

A man-made diamond (bottom of photo) is shown, one of several recently produced by General Electric. It is pictured with a standard diamond, HF phonograph needle. See photo on opposite page.

Dr. Stephen G. Simpson, associate professor of Analytical Chemistry, with students in the chemistry laboratories at the Massachusetts Institute of Technology.

One of the most important scientific achievements now being carried through is the interlocking of the basic sciences and engineering with biological and medical research—the applications of physics and chemistry and technology to the life sciences, with the consequent deeper penetration of the structure of living matter. The whole armamentarium of science is being marshaled to increase our understanding of life and to attack disease and malfunction.

INTENSIVE efforts are being made at the present time to encourage this kind of free interplay among our specialists. In our universities, in industry, and in other research organizations, we have been forced to devise new organizational methods, such as interdepartmental laboratories and coalitions of scientists and engineers in order to provide an integrated approach to such fields as nuclear science, electronics, the life sciences, and cybernetics.

This pattern of joint effort, fortunately, is not limited to the fields of science. We seek better linkages between science and the humanities. I think it was Sir Walter Moberly who once remarked: "The Science man knows nothing of Arts and regrets it; the Arts man knows nothing of Science and is proud of it." This unhappy state of narrowness and snobbishness is changing. Consider for a minute what is happening to the boundary between the natural sciences and the social sciences. One example which comes to mind is the field of communications research. The study of communication and control breaks across many conventional boundaries. We see it bringing together electrical engineers, psychologists, mathematicians, physiologists and assorted social scientists. By marshaling many varieties of specialists, it is serving to illuminate many human problems, problems of human beings in groups and problems of individuals.

Another striking example is a new approach to the study of language which brings together linguists, philologists, psychologists, and mathematicians. It is possible that some of the mathematical theory of communication developed in recent years may prove useful in achieving a more complete understanding of the fundamentals of human speech. Here is a fine example of science and humanities forming a coalition to attack a problem affecting the "human use of human beings."

STILL another coalition in this broad field of communications is the study of international communications. This program involves not only the physical aspects of communications but a study of the kind of information that can be most effective in a particular situation—the effect of the recipient's environment and background on his interpretation of a given communication and a variety of other social science aspects of the problem of conveying ideas from one to another.

Right across the board, of course, teamwork and cooperation make possible our forward-moving, free industrial society. But even those who know it best often need reminders of the fact.

The scientist in his laboratory is in touch with the engineer; industry is ready to use the results of both; our patent system encourages innovation; our professional and business organizations encourage cooperation; our educational system reflects the needs of a free industrial society; our Government — in theory if not always in fact—gives support to individual freedom. This web of relationships, which makes it possible not only to dream but to do, is itself a social invention of tremendous significance.

Our democratic, capitalistic, free-enterprise society is something even greater than those words alone imply. I have suggested, on another occasion, that to speak of what we have as a "voluntary cooperative society" would suggest in some measure what in fact our system really is and would emphasize its spirit, which even we who live here so imperfectly understand.

THE interdependence of all segments of our society can be illustrated by some of the problems we face as we increase our national investment in applied science. As I have already suggested, as industry increases its investment in research, we must expect an increase in the technological complexity of the productive process and a commensurate increase in the demands upon management. The risks will be greater; production decisions will rest upon more esoteric information.

New technology dictates new concepts of size and shows the beneficent value of bigness when bigness fills an economic and social need. Tax laws will have to recognize technological change and the vital importance of encouraging it. We shall have to find ways of increasing available venture capital. Labor as well as management will have to adjust to changing conditions. New problems of the job security of the individual worker will have to be solved so that we may upgrade and not uproot. We shall need more liaison and collaboration between the economist and the businessman.

In short, a new order of magnitude of investment for technology will call for a renewed coalition of effort on the part of all segments of our economy to maintain effectively the integrity of our technological goals.—***End.***

About the Author . . .

Dr. James R. Killian, Jr., the tenth president of the Massachusetts Institute of Technology, is also the first M.I.T. alumnus to hold the distinguished post. Following his graduation in 1926 with a B.S. degree in business and engineering administration, Dr. Killian began his career as assistant managing editor of *The Technology Review*. He next served as its editor from 1930 to 1939. In the latter year he returned to M.I.T. as executive assistant to the president and became president ten years later. His administration has been notably marked by an increasing emphasis on the humanities at the Institute.

Dr. Killian holds numerous Governmental and private awards and honorary degrees. He belongs to many scientific and professional organizations and is chairman of the Army Scientific Advisory Panel of the ASEE. He is also a member of the Science Advisory Committee of the Office of Defense Mobilization and he has served on many other Government advisory boards.

An *American Engineer* SPECIAL REPORT

Re: Engineering Responsibility in Industrial Safety

● Of interest to all engineers in industry, whether their responsibilities lie in the realm of management or production or design, is the U. S. Department of Labor's recently-released Bulletin 175, a 134-page book covering the proceedings of the President's Conference on Occupational Safety, which was held last year.

The publication includes the remarks made by President Eisenhower and Secretary of Labor Mitchell during the conference. The latter's warning against being "fooled" by accident statistics was particularly pertinent. "So long," he said, "as there is one person disabled in your plant by accidents, you are not doing a good job. . . . Do not let us take statistics as the goal. Do not let us take last year's performance and try to beat it by a little bit. Let us take the objective which is the development to the ultimate of the manpower resources of this country so that we can continue to grow great."

As brought out during the conference, the engineer holds the primary responsibility in setting up and maintaining good safety standards in industry. The report of the Committee on Engineering, which was presented to the conference, begins with the statement: "The engineering committee is convinced that the observance and application of engineering principles has been and still is the foundation of the industrial safety movement. The control of unsafe physical and mechanical hazards in the work environment is the fundamental and initial step in industrial accident programs.

"Hazards can be controlled through effective safety engineering applied through standards for machinery and materials specifications, standards for buildings, including adequate fire protection, and standards for materials handling equipment, process revision and many others."

The committee, which was originally organized to report to the first meeting of the President's Conference on Industrial Safety in 1949, offered twelve recommendations with the comment that they should be activated wherever possible at the plant and State level. These recommendations, of major interest to engineers, are as follows:

The engineer holds the primary responsibility in setting up good safety measures.

1. Designers and manufacturers of machinery, machine tools and equipment should give greater consideration to safety requirements, including point-of-operation guards, power transmission guarding, the location and type of stop and start switches, the size, shape, location, and identification of controls, and strength of materials, when the product is designed and constructed.

2. Engineers and architects should develop and apply standards for safe and efficient plant layout . . . Greater consideration to safety, health, and sanitation in space utilization and employee service areas, as well as to factors of safety in building strength should be given in original design and construction and in remodeling of all industrial structures. Special attention should be given to the use of available standards of good practice in providing adequate fire protection and emergency facilities in the design and layout of all establishments.

3. While the relationship between high efficiency and effective accident prevention programs

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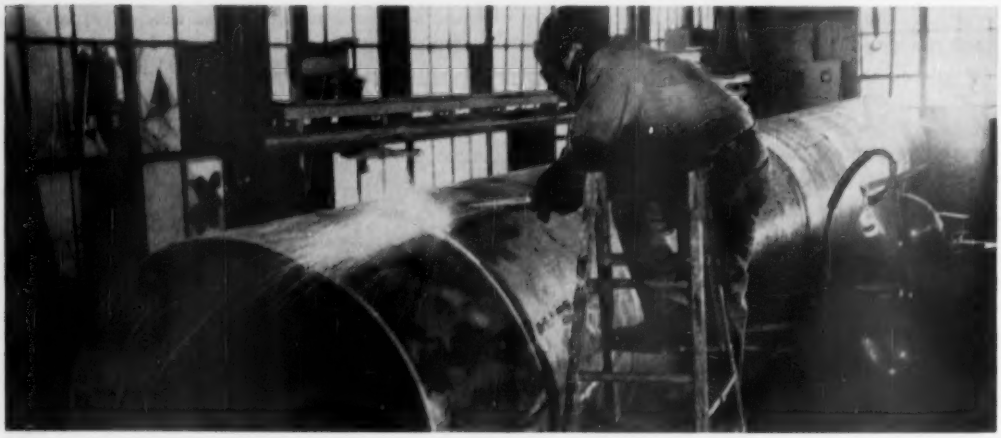
(Continued from previous page)

in industry has been established, additional studies . . . should be developed to emphasize this relationship in industry today. . . .

4. All industries, both large and small, should develop and utilize to a greater degree a comprehensive preventive maintenance program.



5. State regulatory bodies which promulgate and enforce safety codes should enact codes which are in conformity with recognized engineering practices such as set forth in American Safety Standards.

6. All industries should adopt and apply recognized safety engineering standards voluntarily.

7. The U. S. Department of Labor, in cooperation with State agencies, is urged to continue the analysis of existing State codes to determine their coverage and their technical adequacy . . . and to encourage States to bring their present codes in line with such existing standards.

8. Present engineering safety standards should be reviewed in relation to needs, and technical societies . . . and others are urged to cooperate with the American Standards' Association in reviewing the adequacy of present American Safety Standards, and extending their work in this field.

9. Industrial establishments should use American Safety Standards and consult with qualified safety personnel in establishing all purchasing specifications, including the purchasing of personal protective equipment and other safety devices.

10. Engineering colleges should integrate safety engineering principles into all applicable courses in their curricula and establish accredited safety engineering courses.

11. Safety engineering studies and basic research should be instituted on special safety problems on which adequate safety engineering data are not now available, such as noise, use of isotopes, air pollution, hazardous chemicals, fire and explosion hazards.

12. A sub-committee should be appointed to study the need for and the advisability of the establishment of a national certifying body to test, examine, and inspect machine guards and other safety equipment and devices in the light of existing safety standards and to issue certification of approval.

A final significant note was struck during the closing session of the conference in the address of Arthur Larson, Under Secretary in the Labor Department. He pointed out that it is also important to "sell" the idea of safety to the employees in the plant or factory and called on union leaders to aid in this program, noting that: "All of the safety devices and practices and programs in the world are not much good if the worker himself does not know about them or does not believe in them." Good industrial relations, he remarked, in many ways run parallel to effective industrial safety programs.

The Engineer As An Arbitrator

By J. R. Anthony, Jr., P. E. and Attorney

Member, National Panel of Arbitrators of the American Arbitration Association

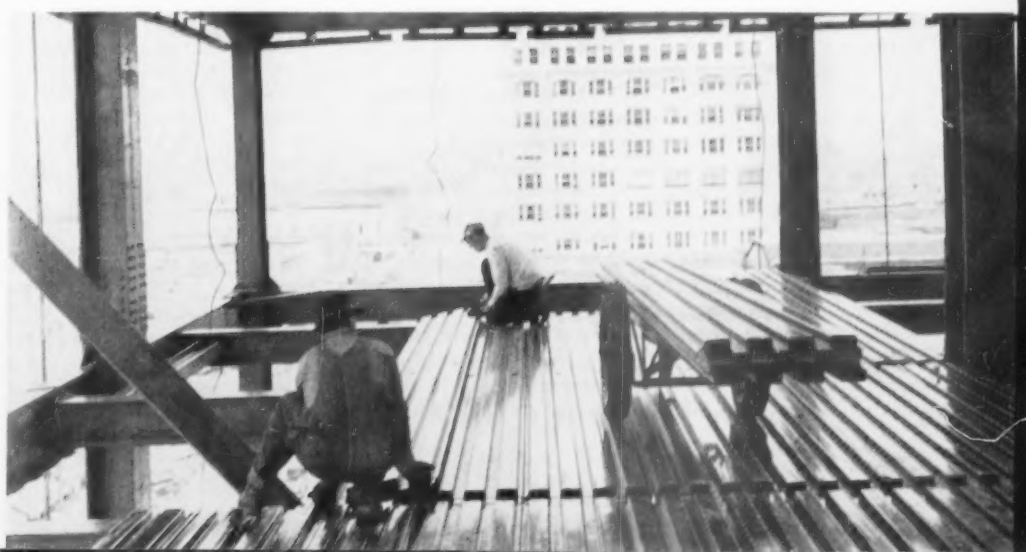
AFTER more than a year of discussion, the mayor of a medium-sized city in the Midwest finally signed a contract for construction of a much needed hospital. Citizens had voted a sufficient appropriation in a previous election, and doctors, engineers and architects drew up plans for what they promised would be the finest and most modern building of its kind in the area. They were especially proud of the operating, delivery and X-ray rooms, which were to have, in addition to other features, terrazzo flooring.

The contractor and more than a dozen sub-contractors immediately got busy on the job, and things moved along so smoothly that the city council was soon able to make preparations for impressive dedication ceremonies. Shortly before the grand event, however, they ran into trouble of a most embarrassing kind. It seemed that the terrazzo flooring, after the curing period, failed to meet the state's requirements for minimum resistance to electricity. The mayor blamed the contractor, who passed the buck on to the sub-contractor, who, in turn, said it was not his fault at all because he merely followed specifications furnished by city architects. It was a three-way donnybrook that threatened to keep the city in an uproar and its citizens without the hospital facilities they needed.

But a practical and speedy solution was found. An overlay of new flooring was immediately installed and all parties agreed that responsibility would be determined in voluntary arbitration, under the auspices of the American Arbitration Association. Two months later, after tempers had cooled, the disputants met in a comfortable, informal AAA hearing room and put the issues before three arbitrators selected by the parties themselves from the Association's National Panel of Arbitrators. One of the arbitrators was a real estate lawyer, another an estimating engineer associated with a prominent construction company, and the third member of the board of arbitration was the head of the mortgage department of a savings bank. Contributing their time without fee, as a public service—a usual practice in commercial arbitration—the arbitrators heard oral testimony and cross-examination, examined contracts, specifications and other evidence, and finally visited the hospital for on-the-spot inspections. Within a few weeks, they rendered an award apportioning the relative shares of responsibility for additional costs and the case was closed.

THE experience described above has been repeated many hundreds of times since 1926 when AAA was founded as a non-profit organization by such eminent leaders of the business community as Charles M. Schwab, Newton D. Baker, Lucius R. Eastman, Herbert Hoover, Charles Evans Hughes and Felix M. Warburg. The Association's Board of Directors still includes many prominent businessmen; among them, Thomas J. Watson of IBM, William Zeckendorf of Webb & Knapp, Harold D. Uris of Uris Brothers, John C. Best of National Gypsum, William T. Van Atten of Dun & Bradstreet, and William A. Mitchell of the Central Trust Company. But, reflecting the extension of arbitration into the labor management field, there are also on the Board such well-known labor leaders as William F. Schnitzler, Daniel W. Tracy, David Dubinsky and Martin Durkin of the AFL, and Walter Reuther, James B. Carey and Emil Rieve of the CIO.

A typical day at American Arbitration Association headquarters in New York or in any one of the 13



Contract specifications must be followed. This one called for the installation of Q-Floor as the subfloor.

—Photo by H. H. Robertson Co

This strip of photographs shows William W. Waite, engineer member of an arbitration panel making an on-the-scene examination to secure data for an industrial case. The American Arbitration Association is headquartered in New York City and has 13 regional offices.

—Photos by AAA

strategically located regional offices may find simultaneously hearings of a dispute between a builder and a contractor over delayed work in one room, a claim of short shipment in international trade in another, while in a third hearing room, labor and management of a giant corporation might be arguing the merits of a discharge.

When the city authorities and the contractors in the hospital floor case differed as to who was responsible for faulty work, they had no previous agreement to arbitrate. They had to approach the AAA with what the Association calls a "Submission Agreement." This agreement read: "We, the undersigned, hereby agree to submit to arbitration under the commercial rules of the American Arbitration Association a controversy over responsibility for improper flooring in construction of the ———— hospital. We agree that this controversy be submitted to three arbitrators selected from the panels of arbitrators of the American Arbitration Association. We further agree that we will faithfully observe the agreement and the Rules and that we will abide by and perform any award and that a judgment of any court having jurisdiction may be entered upon the award."

That was one way of taking care of the situation, but not the best way. The American Arbitration Association recommends that when contracts are written they include a provision for arbitration of future disputes. Most cases come to arbitration on the basis of a clause which reads: "Any controversy or claim arising out of or relating to this contract, or any breach thereof, shall be settled in accordance with the rules of the American Arbitration Association, and judgment upon the award may be entered in any court having jurisdiction thereof."

The American Institute of Architects has for many years used a clause similar to this one in its standard form of contract, and in 1953 the American Society of Civil Engineers and the Associated General Contractors of America, whose members deal with one another in large-scale engineering projects, agreed upon a similar standard form of contract providing for use of the AAA to break deadlocks over appointment of arbitrators.

CLAUSES providing for arbitration of future disputes serve a double purpose: they offer a sure way of resolving controversies and they create an atmosphere of understanding, often making it possible to settle differences without resorting to arbitration at all. Because business disputes often occur without warning, like accidents or fires, the arbitration clause has been called a form of insurance against loss of good will. The comparison is apt: there is, however, at least one important point of difference. While premiums must be paid on fire or accident insurance whether the contingency occurs or not, it costs nothing to put an arbitration clause in a contract until a dispute arises which the parties cannot settle by themselves. When such a controversy does come about, a modest fee, amounting to about one per cent of the monetary claim, in the average case, is all the Association charges for its services. As a nonprofit organization, AAA is maintained only in part by such fees. The difference is made up in membership dues and special contributions from individuals and organizations who want to encourage this method of resolving controversy. The Association's fees make possible maintenance of its National Panel of Arbitrators, consisting of about 13,000 leaders in all fields of business, the professions and the arts, who are available in more than 1600 communities of the United States for free service as arbitrators in commercial cases.

Why do businessmen, thousands of them in virtually every field of manufacturing, construction and trade, rely on private, voluntary arbitration for settlement of commercial controversies? Perhaps the best answer was given many years ago by Harlan F. Stone, late Chief Justice of the United States Supreme Court. "The very refinements and complexity of our court machinery," he said, "often make it cumbersome and dilatory when applied to controversies involving simple issues of fact or law. This is especially the case when the issue of fact turns upon expert knowledge as to the nature or quality of merchandise or the damage consequent upon the failure to perform a contract . . ., which can be better determined by a layman having training and experience in a particular trade or business than by a judge and jury who have not had that training and experience."

The essence of an arbitration proceeding is in its use of experts for the purpose of deciding the fact issues, which in a court proceeding would be decided by a jury of "twelve good and true citizens" among

whom there would probably not be a single one having any knowledge of fundamental principles involved in the controversy. Such a jury arrives at its decision by deciding which witnesses are telling the truth and accepting their version of the facts. Thus their decision is seldom based on anything more than emotional appeal in cases involving engineering or any other technical subject. The experts on an arbitration panel, mutually acceptable to the parties, while subject to some emotional appeal like any normal human being, are able to understand the experts who testify for each side and to draw their own conclusions of fact, regardless of the emotional appeal exerted.

ARBITRATION is especially useful when the parties agree on the law issues, for then there is no need at all for a judicial proceeding—the experts can decide the facts and dispose of the whole case. When there is a complicated issue of law, such as the question of whether a guardian's appointment is valid or invalid, naturally it is preferable to have a court of law make the decision; but if the issue is whether or not a certain welded joint was made with faulty workmanship, which is a question of fact, a panel of engineers is better qualified to decide it than a group of housewives, farmers and insurance agents. In fact, points of law can be handled well by arbitration when there is an attorney on the panel.

To the advantages in arbitration which Justice Stone cited, there might be added the matter of privacy. Most businessmen know that the good name of a company, often its most valuable asset, may be damaged by public disclosure of disadvantageous facts. A case in point was a recent dispute over alleged faulty workmanship between a building owner and an engineering firm which installed an air-conditioning system. Fortunately, the contract covering the transaction had an arbitration clause, which brought the dispute to AAA hearing rooms. The air-conditioning firm won its case, but the victorious attorneys admitted that while they could have won in court as well, it would have been a Pyrrhic victory because of the bad publicity. One of the chief advantages of arbitration is that no facts about a case are ever revealed to the public without the express consent of the parties.

Arbitration is not a new idea in the United States. It is a common-sense, democratic way of resolving controversies and some of the earliest town records show that the practice was prevalent even in colonial times. Abraham Lincoln was an advocate of arbitration and served as arbitrator in boundary disputes. And George Washington, in spite of all possible caution in writing his last will and testament, did not overlook the possibility that his heirs might disagree about the "testator's intent." He directed that all such disputes be settled by "three impartial and intelligent men known for their probity and good understanding," whose decision would be "as binding as if it had been given in the Supreme Court of the United States."

Arbitration is voluntary, private and less formal than court proceedings, but an agreement to arbitrate is nevertheless enforceable under Federal and state laws of contracts. Arbitration awards may be enforced in the courts of every state, and arbitrators' awards are upset only on showing of bias or misconduct by arbitrators—something which is virtually unknown in the whole history of AAA arbitration.—***End.***

About the Author . . .

J. R. Anthony, Jr.

J. R. Anthony, Jr., in addition to being an attorney at law, practicing in Greenville, Texas, is a registered professional engineer, a member of NSPE, and president of the Northeast Texas Chapter of the Texas SPE. He also serves as a judge in the City Court of Greenville one morning each week, and he is a member of the National Panel of Arbitrators of the American Arbitration Association.

Mr. Anthony received both his B.S. (mechanical engineering) and LL.B. degrees from the University of Texas. Before becoming a lawyer, his experience included basic research work with the National Advisory Committee for Aeronautics, sales engineering with the New Departure Division of General Motors Corporation, ordnance design with the Navy, and contract termination work with the Air Force.

He is a member of both the State Bar of Texas and the American Bar Association.

Two NSPE Meetings in the News

State Presidents' Conference, March 18-19, 1955

"Trade unions have evidently embarked on a planned campaign to unionize the professional engineers of America," declared Clarence T. Shoch, president of the National Society of Professional Engineers, in a speech before the NSPE State Presidents' Conference.

"There is no half-way mark in the unionization of the engineering profession. We will either maintain our professional standing as individuals, working through our engineering societies and associations, or we will go all the way down the path of unionism," Mr. Shoch stated in an address that was one of the highlights of the meeting that drew the administrative officials of the 39 affiliated NSPE societies to the Allerton Estates in Champaign, Illinois, on March 18 and 19. "Engineers who indulge in 'professional' unionism," he continued, "will shortly find themselves in the category of unionized skilled labor, no matter how highly-stated their initial motives might have been."

He urged the assembled presidents to continue their efforts to earn and keep the public's confidence.

President Shoch also presided over the general sessions of the Conference, alternating the meeting chairmanship at times with the various NSPE vice presidents. Among the many topics discussed were proposed Taft-Hartley amendments, the status of engineers in the Federal Government and in the Armed Forces, ethical practices, the Kearns Bill, public relations problems, corporate practice, engineers in industry, and science and mathematics instruction in secondary schools.

Over-all scene at the State Presidents' Conference.

Another highlight of the meeting was the address delivered at the March 19th banquet by Dr. William L. Everitt, dean of engineering at the University of Illinois. Dean Everitt emphasized the importance of the engineering approach to problems of public service and urged that engineers, as professional men, concern themselves with such service.

Annual Meeting, Philadelphia, June 2-4, 1955

Dr. Andrey A. Potter, Dean Emeritus of engineering at Purdue University, has been selected to receive the annual NSPE award for meritorious service.

The long-time engineering educator will be presented with an engraved plaque at the National Society's annual banquet, June 4, at the Bellevue-Stratford Hotel in Philadelphia.

The presentation will be made by outgoing NSPE President, C. T. Shoch.

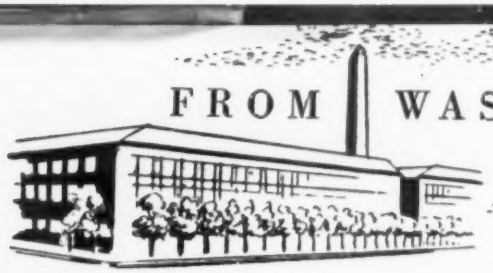
Dr. Potter, president of Bituminous Coal Research Inc., was a pioneer in personnel work for engineering students and in humanizing engineering education. He is the author of several books and over 300 articles on power engineering and engineering education.

A resident of Lafayette, Indiana, Dr. Potter has held office in numerous engineering and professional societies and has served as a government consultant in engineering problems.

The inscription on the plaque to be presented to Dr. Potter reads:

"In recognition of his inspired teaching and sympathetic encouragement of individual students of engineering, his wise counsel in the field of engineering education, his leadership in raising the status of the profession and his manifold services to the Nation . . ."

At left: Here's part of beautiful old Philadelphia you'll see while at the annual meeting in June. Right: Dr. A. A. Potter, who will receive the NSPE Award at the June affair.



FROM WASHINGTON

By
Milton F. Lunch,
N.S.P.E.'s Legislative Analyst

THE "NEW" HOOVER COMMISSION VS. ADVANCE PLANNING

The original Hoover Commission stimulated considerable disagreement as a result of many of its recommendations for reorganizing of Governmental functions, such as the suggested transfer of the Army Corps of Engineers' civil works to the Interior Department (which has not been adopted). But, by and large, the series of recommendations did not involve political acrimony or involve the Commission in more than normal dissent.

The Second Hoover Commission has recently started filing reports with Congress as a result of its new studies, but this time the political fur is flying. The difference in the reception between the two Commissions is accounted for by the fact that the first survey operation involved authority for the Commission only to recommend reorganizations and consolidations of Governmental programs among the several Federal agencies. The current authority, however, authorizes the Commission also to recommend the abolition of Federal services, activities and functions "not necessary to the efficient conduct of Government" and the elimination of nonessential services, functions and activities which are competitive with private enterprise."

Mr. Shoch

Under this broad grant of authority, the present Commission's report to Congress dealing with Federal lending agencies, recommended a sweeping curtailment of Federal lending activities. It was suggested that the program of loans for the preparation of engineering and architectural designs for state and local public works projects be abolished. Also, the Commission advocated the elimination of loans for public works (except for public housing projects) and college housing. It was urged that the Rural Electrification Administration be reorganized on a self-supporting basis and secure its financing from private sources. Other parts of the report urged the merger of Federal lending activities into private enterprise, that other functions be reduced and that interest rates be increased.

The sweeping recommendations brought dissents from five of the twelve Commission members on various portions of the report. The National Rural Electric Cooperative Association has charged that the recommendations on rural electrification amount to the abolition of the program and have labeled it, "Operation Bankruptcy." The Association for Higher Education has criticized the recommendations on the elimination of loans for college housing, calling that part of the report "puzzling" and not in accord with the facts. NSPE President Clarence T. Shoch issued a statement with regard to the suggested demise of the advance planning program, stating that such action would be a serious mistake and would stop the current impetus toward sound planning of needed public works.

Commission Member Attacks

Perhaps the strongest indictment of the report was issued by one of the Commission's own members—Representative Chet Holifield of California. He issued a separate statement declaring that the report is "so faulty in concept and method that I must object to it even though a few recommendations, standing alone, may have merit." The Californian declared:

> "The Congress re-created the Hoover Commission to study the present organization and operations of the Executive Department and agencies, with a view to better management and economy. I do not believe that the Congress wanted advice from the Commission on public policies of every sort.
>
> "The Commission has construed its Congressional mandate otherwise. This report indicates that the Commission is willing to roam far and wide in the field of public policy.
>
> "No matter how wise and well-informed, the 12 Commission members cannot be expected

(Please turn the page)

(Continued from previous page)

to have more than a casual acquaintance with many of the complex issues posed by this report. The task-force study contributed little, in my opinion, to the deliberations of the Commission."

Representative Holifield objected specifically to a number of recommendations, including the abolition of loans for planning and construction of public works. Commissioner Arthur S. Flemming, Director of the Office of Defense Mobilization, and Attorney General Herbert Brownell, Jr., also entered specific dissent to the recommendation on the advance planning program.

◄ Attorney General Herbert Brownell, Jr.

Rep. Chet Holifield of California ►

The reasoning behind the Commission's adverse analysis of the advance planning program was that such an operation could not be justified as a proper Federal function. "This type of development threatens a further reduction of the field in which individual American citizens will have responsibility and influence over the conduct of their hometown affairs," the report said. "These localities which want the benefits must conform to plans approved by the Federal Government. The tax burden to support this program falls alike on those who participate and those who decline to do so.

"It is our view that if the States and municipalities can seriously consider plans for public improvements involving the expenditure of substantial amounts of money, they should be able to afford the costs of planning such programs. The Federal Government should encourage such activities and should provide advice through appropriate departments or agencies, but grants and interest-free loans for planning public improvements is another matter."

Eisenhower Wants Advance Planning Made Permanent

It was noted in the statement by NSPE President Shoch that the Commission recommendation was in direct opposition to a recent recommendation by President Eisenhower that the advance planning program be extended and put on a permanent basis by the use of a revolving fund. The Chief Executive had also announced that he favored the establishment of an office of Coordinator of Public Works (American Engineer, February, 1955). The Joint Congressional Committee on the Economic Report also commented within recent days that the Public Works Coordinator idea should be put into operation as soon as possible to aid the acceleration of public works and the development of a shelf of plans for public works projects, to be activated if private employment falls off.

NSPE has endorsed the advance planning program, which has been authorized by Congress on three separate occasions, and has testified before Congressional committees in support of the idea. The reasoning of the Hoover Commission that the states and municipalities should be able to bear the expenditures for engineering and architectural plans and studies prior to construction of the works is unsound, the NSPE statement said. "This reasoning indicates that the Commission is ignoring the fact that the advance planning program came into being precisely because the states and municipalities could not secure the necessary financing for public works plans which are necessary before a bond issue for the construction cost can be floated successfully."

According to the Hoover Commission, at the close of the 1954 fiscal year the Government's outstanding investment in the advance planning program was $36,254,000 of which $26,369,000 had been repaid. The current advance planning program carries an authorization of $10 million for interest-free loans, to be repaid when construction starts. Last year Congress provided $1.5 million for the program and the President's pending budget request covers the remaining $8.5 million, to be loaned prior to June 30, 1956, when the current program authorization expires.

In view of the widespread support for the advance planning program in Congress and in the Executive Branch, led by the President himself, it would appear that the Hoover Commission proposal will not succeed.

Ground Broken for Bldg.; Certificates Still Available

NSPE President Clarence T. Shoch breaks ground at the NSPE Headquarters Building site in Washington, D. C. From left to right are: Paul H. Robbins, NSPE executive director; Professor Russell B. Allen, Society treasurer; O. H. Beasley, consulting engineer; President Shoch; Harry B. Davis, contracting associate; Louis Justement, associate architect; Joseph Nebel, general contractor; and Branch D. Elam, associate architect.

A ground breaking officially launched the construction of the NSPE National Headquarters Building in Washington, D. C.

NSPE President Clarence T. Shoch turned over the first lumps of earth early March 25th on the building site at 2029 K Street in the Capital's Northwest section.

President Shoch declared the event to be "another milestone in the development of a strong professional engineering society, equipped with the proper housing facilities to perform the necessary tasks for its more than 34,000 members."

"Our National Headquarters Building," Mr. Shoch added, "will be an edifice in which every member can take a well justified pride, and we hope that it will become, in time, a crossroads of professional activity in our Nation's Capital City."

Assisting President Shoch at the official ground breaking ceremony were Executive Director Paul H. Robbins; Louis Justement, associate architect, of Washington, D. C.; Joseph F. Nebel, general contractor; Russell B. Allen, professor of civil engineering at the University of Maryland, and treasurer of NSPE; and O. H. Beasley, Washington, D.C., a member of the Advisory Committee on Headquarters Housing.

Excavation work on the building site began immediately after the ground breaking. The four-story building is expected to be ready for occupancy by January 1, 1956.

The basement and first two floors of the fully air conditioned building will be occupied by the Society, and the top two floors will be rented as office space. The building will also house the offices of the AMERICAN ENGINEER.

Construction of the approximately $100,000 building project is being financed by the sale of building fund participation certificates to the membership. As of April 1 a total sale of about $275,000 in certificates has been realized.

The remaining $125,000 in certificates will be sold on a "first-come-first-served basis," according to President Shoch. Certificates are available to members, in unlimited amounts, in units of $100 each and pay four per cent interest annually. Members may obtain subscription blanks from the National Headquarters office or from the national directors in the various states. A prospectus, fully describing the certificates and setting forth the conditions of the sale, is available on request.

NSPE Ballots Counted; Neff New Prexy

Following the official count of the ballots by the Nominating Committee of the National Society of Professional Engineers, it has been announced that Allison C. Neff of Middletown, Ohio, has been elected to the NSPE presidency for the 1955-56 administrative term. Mr. Neff, who has long been active in National Society affairs, is vice president of Armco Drainage & Metal Products, Inc. He is also a past president of both the Ohio Society of Professional Engineers and the Cleveland SPE.

At the same time announcement was made of the election of Warner Howe of Memphis, Tennessee; Lindley R. Durkee of Mercer Island, Washington; and Garvin H. Dyer of Independence, Missouri, and of the re-election of Louis F. Frazza of Hawthorne, New Jersey; R. J. Rhinehart of Pine Bluff, Arkansas; and Virgil E. Gunlock of Chicago, Illinois, to the regional vice presidencies of the National Society.

Russell B. Allen of College Park, Maryland, was also re-elected to the post of treasurer for an eighth term.

The new officers will be installed during the forthcoming annual meeting in Philadelphia, June 2-4, and will take over active administration of the Society on July 1.

The NSPE Nominating Committee, which confirmed the election results in an official statement, was headed by John D. Coleman of Dayton, Ohio.

APRIL MEETINGS Of Note

Michigan Engineering Society—Annual Convention, April 1-2, The Cranbrook School, Bloomfield Hills, Mich.

Atomic Industrial Forum and **Stanford Research Institute**—Meeting on "Atomic Energy—the New Industrial Frontier," April 4-5, Mark Hopkins Hotel, San Francisco, Calif.

American Society of Lubrication Engineers—Annual Meeting, April 13-15, Hotel Sherman, Chicago, Ill.

American Society of Heating and Air-Conditioning Engineers—Regional Meeting, April 15-16, Oklahoma City, Okla.

American Association for the Advancement of Science; Southwestern and Rocky Mountain Division—Annual Meeting, April 24-26, Santa Fe, New Mex. Also, International Arrid Lands Meetings, April 26-May 4, Albuquerque and Socorro, New Mex.

Society for Advancement of Management and **American Society of Mechanical Engineers (Management Division)**—Time Study & Methods Conference on "Retooling Management for Competition," April 28-29, Hotel Statler, New York City.

NSPE Salary Survey Shows Income Increases

Basic computations of the 1954 salary survey have just been released and reflect an increase in income of all groups over the 1952 survey.

The second salary survey to be conducted by NSPE, reveals that the median earnings of NSPE's membership are up 8% over 1952; the lower decile group increased 9%; the lower quartile increase was 9%. The upper quartile reflected an increase of 7%, while the upper decile moved up 6%.

This first tabulation shows that 90% of the membership earned more than $5,570, while 75% earned more than $6,690. The median of all professional engineers returning the questionnaire was $8,460 (8% over 1952). Twenty-five per cent earned $11,700 and 10% reported incomes of more than $18,210. The comparative increase of 1952 income over 1954 may be readily illustrated in the following table.

PROFESSIONAL ENGINEERS' INCOME

Group	1952	1954	Increase
Lower decile	$5,120	$5,570	9%
Lower quartile	$6,140	$6,690	9%
Median	$7,850	$8,460	8%
Upper quartile	$10,980	$11,700	7%
Upper decile	$17,190	$18,210	6%

More than 34,000 questionnaires were mailed to NSPE members and 14,787 returns were received in time for inclusion in this survey—a return of more than 43%. However, it was necessary to eliminate 459 questionnaires because of lack of sufficient information on critical questions. It was felt, however, that 14,328 usable questionnaires represent an excellent cross-section of NSPE membership and certainly serve as a valid and reliable statistical computation.

Noah E. Hull of Houston, Texas, vice-chairman of the Salary and Fee Committee, has pointed out that the Committee limited the scope of the survey to income, year of entry into the profession, grade, branch of engineering, function, field of employment, and region in order to insure a widespread response. The committee felt that income informa-

(*Continued on page 26*)

Industry, Educators, P.E.'s Hail New NSPE Book

"A Professional Look at the Engineer in Industry," prepared by the Engineer-in-Industry Committee and published by NSPE, has been accorded an enthusiastic reception following its release early in March.

Orders for the 128-page study of engineer-industry relationships and recommendations for improving those relationships are flowing into the headquarters office at an accelerating rate. Many laudatory comments on the work have been received from prominent industrial leaders, educators, individual members, labor relations experts and others. Complimentary copies of the book have been sent to all deans of engineering, associations in the engineering field and key government officials. Several deans have written that they are considering the use of the book as text material for engineering students.

The publication has been reviewed and reported in major publications, such as the *New York Times*, *Daily Labor Report*, *Engineering News-Record* and *Industrial Relations News*. Editors of other prominent publications are preparing reviews.

Many companies and other organizations, as well as individuals, are ordering quantity copies of the book. Reduced prices on quantity orders of 25 or more copies have been established at $1 per copy for members and $2.00 per copy for non-members. The announcements and other forms have been made available to state societies and chapters and are being distributed by them to industrial executives, engineers and others. The announcements and order material are available to any NSPE member for re-distribution upon request.

A well-known authority on industrial psychology has written that the book "reveals a sincere effort to tackle a series of important problems in the operation and development of professional engineers." A dean of engineering at a northeastern school said that he considers the book "intimately related to the subject of professional ethics." Another dean commented that he was "much impressed with the work your Committee has done on this perplexing problem."

THEY'LL DO IT EVERY TIME **By Jimmy Hatlo**

WHEN THE TAX BEAGLE WAS CHECKING UP--FLOTILLA GAVE HER SPOUSE'S OCCUPATION AS ····
HIS OCCUPATION? MECHANIC'S HELPER··
BUT WHEN THE CENSUS TAKER IS CENSUSING ··· HUBBY'S CLASSIFICATION IS ···
ENGINEER··
THANX AND A TIP OF THE HAT© HAT to RITA TOWER, 25 RED GATE LANE, COHASSET, MASS.
COPR. 1954, KING FEATURES SYNDICATE, INC., WORLD RIGHTS RESERVED.

On page 42 of "A Professional Look at the Engineer in Industry," (see above story and next page) the NSPE Engineer-in-Industry Committee comments that the 1950 Federal Census figures on the number of engineers in the United States are of dubious reliability because the census takers list the occupation as given by the individual "or frequently for him by his wife" with only a cursory check of the correctness of the occupational designation. Famous cartoonist Jimmy Hatlo conveys the same idea above in amusing and accurate form.

ANNOUNCING...

A Professional Look at the Engineer in Industry

HERE, after more than a year of intensive research and study, is a major publication of vital importance to the engineering profession. The Engineer-in-Industry Committee of NSPE has delved into all phases of the professional and economic status of that group which comprises the largest number of engineers in any functional field. This publication is truly unique in that it brings together in easy-to-read form, for the first time, all of the pertinent facts about the background and present situation bearing on the future professional development of engineers employed in all types of industry and the related effects on all other professional engineers.

• 128 pages • 6 illustrative charts • 11 tables of economic data • fully documented by more than 250 references • bibliography and index

A Professional Look at the Engineer in Industry presents a challenging program to bring about improvements in the professional and economic position of engineers in industry.

CHECK THESE CHAPTER HEADINGS

_____ The Impact of the Wagner Act
_____ The Medicine of Taft-Hartley
_____ Taft-Hartley In Action
_____ The Causes of Dissatisfaction
_____ The Influence of Unions
_____ Professionalism Versus Unionism
_____ The Middle Ground
_____ A Program of Action
_____ Facing Up To The Challenge

The readers of this book will find facts, comments and answers to such important problems as:

- The Causes of Dissatisfaction Among Engineers in Industry.
- Past and Present Economic Facts.
- The Danger of "Leveling" in Professional Salaries.
- Comparison of Engineer Salaries With Other Professions — With Skilled Labor.
- Improving Engineering-Management Communications and Utilization.
- The Challenge of Engineering Unions.
- Historical Development of the Union Movement among Engineers.
- The Organization and Purpose of Non-Bargaining Engineering Associations.
- How to Improve Employment Conditions.
- Professional Development Without Regimentation.
- And Many, Many Other Vital Topics.

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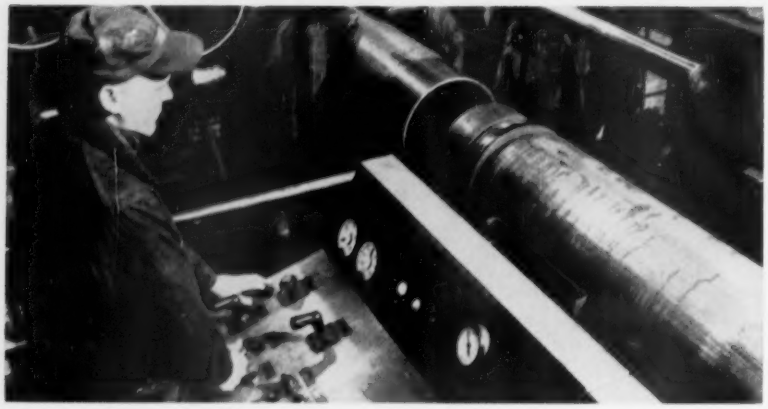
- - - NEW PROCESSES - - -

Cold Expanded Seamless Pipe



The Cold Expander Operator prepares to expand a length of seamless pipe to 24 inches in diameter at the Lorain Works of United States Steel Corp.'s National Tube Division in Lorain, Ohio.

Shipment of the first commercial order for a new product—cold expanded seamless pipe—is now being made from the Lorain Works of U.S. Steel Corp.'s National Tube Division.

Operation of the new expansion unit at Lorain, first of its kind in the pipe-making industry, marks the successful completion of a program of continuous research and development. The equipment is designed to expand pipe in the size range of 16-inch to 26-inch outside diameter.

Preparation of seamless pipe for expansion begins at two rotating cutoff machines which were specially designed to keep pace with the rest of the producing unit. In these machines, the pipe is held by clamps while six cutting tools in the rotating head trim pipe ends four to six times faster than ordinary pipe cutoff machines.

Next, the pipe is placed in position for expanding. A plug, weighing nearly 1,000 pounds, is attached to the end of a long mandrel bar. This two piece plug consists of a heavy point followed by a highly machined, alloy ring which does the actual expanding. To withstand the great pressure, the mandrel bar is made from 14-inch heavy wall seamless pipe.

Powered by a 500 H.P. motor, the mandrel bar forces the plug through the pipe at a rated 300,000 lb. thrust, expanding the diameter of the pipe by the specified amount. A water soluble lubricant is applied to the inside surface of the pipe immediately ahead of the plug to reduce friction.

After leaving the opposite end of the pipe, the plug drops off the mandrel bar onto an elevator which lowers it to a conveyor for transportation back to the original point. Another elevator raises the plug into position for the next thrust. During full operation, five plug units are circulated to maintain smooth operation.

The expanding process shortens the pipe by several inches, depending on the size of pipe and the degree of expansion. Thickness of the pipe wall is only slightly reduced. Straightening and inspection follow expansion.

Large Paper Sensitizing Machine

One of the world's fastest and most modern, large paper sensitizing machines is now in operation at the Chicago plant of the Charles Bruning Company, Inc. The new high speed giant was designed in its entirety by the company's own engineering staff for faster speeds and new high levels of quality control and uniformity; maintained in all production phases by the latest electronic drives and many design innovations.

The sensitizing solution is precision metered by means of a unique Bruning design air knife which insures a smoother, more even application, free of coating cockle. An unusual degree of flatness and smoothness is secured by equipoise tension on the paper's travel through the machine, and adjustable balanced drying of both sides of the sheet, with predetermined curl control, according to Bruning.

PECBI Training Report Due May 1

A publication date of May 1 has been scheduled for "How To Train Engineers In Industry," the fourth in a series of executive research survey reports sponsored by the Professional Engineers Conference Board for Industry.

The nation-wide survey on engineer training in industry was undertaken in cooperation with NSPE.

Final approval of the lengthy report was made early in March by the members of the Conference Board, according to John D. Coleman, Board chairman.

Coleman said pre-publication copies of the report have been released to the engineering press and extensive coverage in these technical and professional periodicals is expected.

Sample copies of the report will be distributed to a large mailing list of industrial, educational and governmental groups, Coleman added.

The published report will be available to NSPE members at **$1 per** copy. Non-members may purchase it for $2.

Survey

(*Continued from page* 24)

tion of this kind would be most helpful if it could be secured on a continuing basis at least every two years. Because of the cost of conducting such a survey, and in the hope that similar surveys might be conducted at frequent intervals in the future, it was felt that if basic information could be obtained more frequently it would be of greater value than to secure exhaustive information at longer intervals.

Furthermore, it was realized that surveys conducted over a short span period would permit comparative analysis by year of entry into the profession, further broken down by branch, duties, field of activity and region. The 1954 salary information will enable the committee to present in the ultimate report comparisons between 1952 and 1954 income on the basis as outlined above.

It is anticipated that a final report will be available in the near future, and as information becomes available and the report is released notification will be carried in the AMERICAN ENGINEER.

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N.S.P.E. Believes

THE BOARD OF ETHICAL REVIEW

BY PAUL H. ROBBINS, P.E.

Executive Director

N.S.P.E.

One of the hallmarks of a profession has always been recognized as adherence to an established code of ethics. There have been a number of indications in recent months of an increasing awareness on the part of the engineering profession of this aspect of its professional stature.

Certainly, for engineering societies and for the majority of the members of the profession, ethics are nothing new. There have been Codes of Ethics promulgated by various groups for many years. Because of the number, and to some degree the divergence of these, the ECPD Committee on Ethics several years ago formulated a Canons of Ethics of some 28 points, plus a foreword. The general acceptance of these Canons attests to the outstanding job accomplished. All of the major engineering societies have either adopted the Canons, or endorsed them as supplemental to their already existing Codes.

As engineering applications have become more complex, situations and conditions have arisen not in existence or contemplated at the time the Canons of Ethics were written. Nevertheless, the Canons are sufficiently broad in scope to have presented principles which, in general, are applicable to most of these problems. Frequently, however, individuals or groups in the profession are faced with the necessity of interpreting the Canons as they apply to a specific set of conditions, each case being unique in itself.

The National Society of Professional Engineers, recognizing this condition, last year established a Board of Ethical Review. This Board is composed of six eminent members of the profession, two appointed each year for a three-year term in order that the continuity of decisions reached by the Board may be carried forward in application to succeeding problems. The Board was established with the thought in mind of receiving from various State Societies, or even Chapters, specific situations on which those groups desire an impartial evaluation of the ethical principles involved. Already a number of problems have been presented and are being formulated into decisions by the Board.

The Board currently is under the Chairmanship of Past President T. Carr Forrest, Jr., and has as members the following, representing the six administrative areas into which NSPE is divided:

Southwestern Area—T. Carr Forrest, Jr., Chairman

Southeastern Area—C. L. Emerson

Northwestern Area — William L. Thrailkill

Northeastern Area — Daniel C. Walser

North Central Area — Murray A. Wilson

Central Area—George E. Ekblaw

Because ethics play such an important part in the stature which a profession may attain, more and more emphasis is being placed on ethics, both in the preparation of young men for the profession and in evaluation of their capabilities at various points in their professional progress. It is interesting to note that there are emerging on some of our registration examinations questions pertaining to ethics; our technical and professional press is carrying more frequent articles on the importance ethics should play in the profession; and training programs designed within industry and elsewhere for the further development of young men, all contain emphasis on ethical standards.

NSPE believes the Board of Ethical Review can serve a worthwhile function, not only to the Society but to the profession as a whole, by bringing the thinking of eminent engineers to focus on some of the knotty ethical problems to which there is a direct application of the Canons or existing Code. It is believed that as time goes on, the body of decisions and interpretations rendered by this Board will serve as an excellent background for study by students of the profession, as well as by Registration Boards and Ethical Practices Committees within the Society, who are called upon to maintain the high standards of professional practice.

About Engineers' Week--1955

National Engineers' Week—1955 was as impressive an observance as has ever been recorded in the annals of any professional group in the United States. Sparked by the succinct slogan, "Engineering—Builder of a Brighter Future," the many and varied radio and TV programs, panel discussions, banquets, speeches, and other activities arranged by the members of the National Society of Professional Engineers gave sterling testimony to the importance of the engineer to the future of the Nation and alerted the public as never before to the force that the engineer wields in the lives of all mankind.

From the dawn of February 20th when the first proclamation—that of Governor Luis Muñoz Marin of Puerto Rico—went officially into effect until the last radio announcement was made on the West Coast on February 26th, the engineer was the man of the hour, and the tributes paid to him by both public officials and private citizens were warm and generous.

President Eisenhower's letter to NSPE President Clarence T. Shoch was widely quoted. The well-received address on *The Engineer's Role in America*, delivered by Reclamation Commissioner W. A. Dexheimer before the Arizona SPE's Engineers' Week banquet in Phoenix, was inserted in the *Congressional Record* by Senator Carl Hayden of Arizona. The roster of other speakers at banquets throughout the country reads much like a *Who's Who* list, including such men as James F. Lincoln, chairman of the board of The Lincoln Electric Company, who spoke at the Canton, O., Regional SPE meeting, Under Secretary of Commerce Walter Williams, who addressed a dinner meeting of the Anthracite Chapter of the Pennsylvania SPE in Pottsville, and Dr. James R. Killian, Jr., president of M.I.T., who was the special guest of the Toledo Technical Council, cooperating with the Toledo SPE, and whose address is featured elsewhere in this issue. So does the record of governors and mayors who signed official proclamations.

The enthusiastic support of many leading United States Industries—such as Westinghouse Electric Corporation, which sponsored the NSPE-prepared radio program on the *Nautilus* over five Pennsylvania stations, General Electric, Minneapolis-Honeywell, the Pacific Telephone and Telegraph Company, and many others—gave an added boost to the success of the observance. Similarly, the cooperation of many other professional and technical societies and such schools as Louisiana Polytechnic Institute, and the Colleges of Engineering at Ohio Northern University, and Rutgers University complemented the NSPE plans. A number of NSPE's affiliated state societies—Tennessee, Minnesota, Oklahoma, Georgia, and Colorado—also scheduled their annual meetings to coincide with the celebration and thus gave a dual import to the Week.

Governor's Tribute

"The ingenuity of our engineers not only has changed the pattern of industry in this country but has contributed enormously to raising our standard of living and providing the opportunity to enjoy the comforts and conveniences which are by-products of a productive and progressive society."

—Hon. Thomas B. Stanley
Governor of Virginia

Editorial support also was widespread with many newspapers running special Engineers' Week supplements. Among these were: *The St. Louis Daily Record*; *The Lufkin Daily News*, Lufkin, Tex.; *The Waukesha Daily Freeman*, Waukesha, Wis.; *The Dallas Morning News*; *The Arizona Republic*, Phoenix, Ariz.

A complete roundup of the 1955 National Engineers' Week activities successfully carried out by the state societies and chapters under the general chairmanship of Anatole R. Gruehr would require far more pages than could be allocated in a single issue of the AMERICAN ENGINEER. Many of the highlights, however, are spotlighted in the pictures on these pages or reported briefly in the following paragraphs. . . .

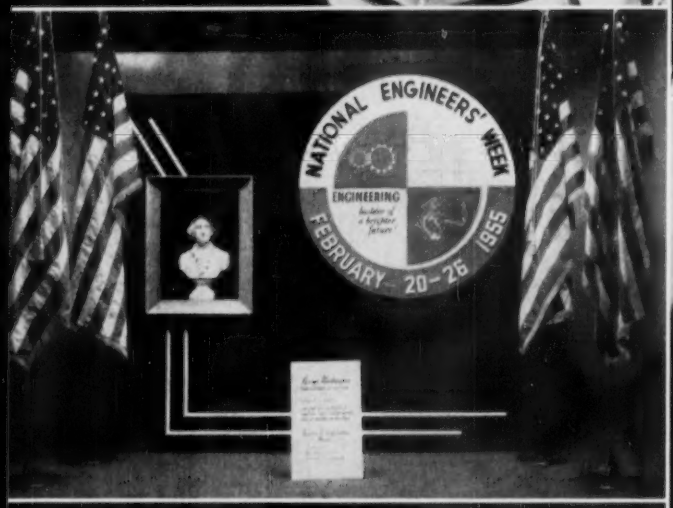
There was considerable activity in Florida with outstanding banquets sponsored by both the West Palm Beach and Jacksonville Chapters, the former featuring Frank S. Wright, a public relations expert, as the speaker, and the latter featuring Congressman James E. Van Zandt of Pennsylvania. . . . Governor Frank G. Clement proclaimed the observance in Tennessee where the Nashville Chapter, with the local technical societies, sponsored the first annual "All Engineers Dinner," and the Knoxville Chapter arranged a special radio program featuring addresses by Dean N. W. Dougherty and three of its past presidents—Armour T. Granger, Ernest M. Titus, and James E. McDonald. The Knoxville P.E.'s also sponsored a radio panel that featured local women in the engineering field. . . .

The observance in Savannah, Georgia, where Mayor Lee Mingledorff, Jr., himself an engineer, proclaimed the Week, was climaxed by a banquet at which NSPE Executive Director Paul H. Robbins was guest speaker. An effective speakers' bureau was another well-received activity of the Savannah P.E.'s. . . . Atlanta's efforts were concentrated on the program for the State Society's annual winter meeting. . . . In Augusta, a very successful Week was reported with the cooperation of the local personnel of the Du Pont Company working on the Savannah River Project.

In West Virginia, Governor William C. Marland and Mayors Theurer of Huntington, and Hanway of Fairmont were among those signing proclamations as the State's fifteen chapters arranged a variety of programs. . . . Members of the Delaware SPE heard Civil Defense Administrator Val Peterson deliver a major address on CD problems at their Engineers' Week Banquet. . . . The District of Columbia SPE joined with 31 other local engineering and architectural societies for a special dinner meeting at which Dr. John J. Theobald, president of Queens College, New York, urged the technical men to give more thorough attention to the human problems sometimes contingent on the advances they make scientifically. . . .

The Week's activities in New England were many and varied. . . . The Connecticut SPE, which chose Leonard S. Hobbs, vice president in charge of engineering at the United Aircraft Corporation, as its engineer of the year, also joined with the Bridgeport area engineering organizations in presenting a day-long program on February 26th. . . . Jeremiah E. Sweeney, president of

(*Continued on page 30*)



ENGINEERS' WEEK SCENES—*First column, top photo:* Governor Marvin Griffin of Georgia signs a proclamation while, l. to r., R. J. Boston, Charles W. Lines, Orbie Bostick, and Paul Weber watch. *Second photo:* This shows a Philadelphia Electric Company display. *Third photo:* In St. Paul, Minn., l. to r., N. T. Rykken, James J. Ryan, Sidney L. Stolte, W. L. Hindermann, and NSPE President Clarence T. Shoch confer during the observance.

Second column, top photo: L. to r., Robert Miller, PSPE president; Walter Williams, Under Secretary of Commerce; J. J. McBreaty; Garfield Schnee, Anthracite Chapter president, and David Baird are shown during the Anthracite meeting at which Mr. Williams spoke. *Second photo:* Principals at the Brooklyn Polytechnic Institute testimonial dinner are, l. to r., seated—Henry G. Riter, III, NAM president and guest speaker; A. A. Vioni; Dr. Harry S. Rogers, Tech president; and Joseph B. Cavallaro; standing—Dr. Archibald F. Glover, Anthony J. Giardina, Milton Solomon, Dr. John I. Knudsen, and Msgr. Ronald B. MacDonald. *Third photo:* Governor Thomas B. Stanley of Virginia presents his proclamation to James J. Corbalis, Jr., VSPE president, at left, while Edward H. Ruehl, Fred P. Wilmer, Edgar Boynton, and A. W. Davenport watch. *Fourth photo:* In charge of Engineers' Week plans in Broome County, N. Y. were F. A. Schnell, Lee R. Post, and Lloyd D. Armstrong, seated, l. to r.; and, standing, V. O. Shumaker, H. J. Hajko, R. N. Blake, Irving Beiley, Fred Frantz, J. P. Peterson, Carl Winterberger, and A. D. French.

Engineers' Week

(Continued from page 28)

the Council of the City of Norwich, Conn., and Mayor R. J. Duggan of New London were among those officially announcing the Week in the Eastern Chapter area. . . . The Berkshire Chapter of the Massachusetts Society reported that the highlight of its observance was the TV panel discussion on the advantages of engineering as a career and the contributions of the engineer to the community, in which Bruce Crane, R. C. Sprague, R. L. Gibson, and W. S. Ginn participated. . . . The North Shore Chapter also offered a panel discussion on engineering careers.

The Week's activities in New York were on a grand scale. . . . In Buffalo, where Mayor Steven Pankow issued an appropriate proclamation, the Greater Buffalo Advertising Club, in cooperation with the Erie County Chapter, set February 22nd as "Engineers' Day" and had for its luncheon speaker M. W. Oettershagen, deputy administrator of the Saint Lawrence Seaway Development Corporation. . . . The Albany County Chapter was one of the many sponsoring the NSPE radio program—*Medicine, the Law, and Engineering*—and joined with the Rensselaer and Tri-County Chapters for a joint dinner. . . . The New York City area chapters' big event was a dinner honoring the Polytechnic Institute of Brooklyn. . . .

A Definition

"The professional engineer . . . is really a scientist, an inventor, an artist, a builder, a manager, an economist—and frequently a philosopher, too. His field is as broad as the needs of civilization and as important as the welfare of mankind."

—The Palm Beach Post West Palm Beach, Florida

Suffolk County P.E.'s selected County Highway Supervisor Harry Tuthill as Engineer of the Year. . . . Mayor A. C. Wemple proclaimed the Week in Schenectady, and Dr. John R. Dunning, dean of engineering, Columbia University, was guest speaker at a banquet attended by 400 engineers and their guests. . . . The Westchester County Chapter concentrated on impressive displays in cooperation with local industries and radio and newspaper publicity as did the Syracuse Chapter. . . . The Broome County Chapter secured proclamations from Mayors D. W. Kramer of Binghamton, D. E. Stocum of Johnson City, and C. B. Parkhurst of Endicott, and organized many important exhibits in cooperation with leading industries. . . .

The Fayette Chapter of the Pennsylvania SPE was another whose Engineers' Week exhibits were particularly outstanding, and several of its officers, including President Kenneth B. Old, spoke at various local service club meetings. . . . Also in Pennsylvania, where Governor George M. Leader had issued a proclamation, the Lincoln Chapter, in cooperation with technical societies of the Greater York area, marked the observance at a banquet at which Senator George W. Malone of Nevada was the guest speaker. . . .

THEY HELPED CELEBRATE—*Top row, first photo:* Governor T. R. McKeldin of Maryland (seated) discusses his proclamation with E. E. Hanhart, F. E. Winslow, C. E. McCaffray, R. G. Dietrich, O. W. Turpin, L. G. Smith, A. M. K. Croft (hidden), and J. J. O'Donald, standing, l. to r. *Second photo:* Governor Fred Hall signs the Kansas proclamation while W. W. Mains and Dr. Reed Morse look on, l. and r.

***Second row, first photo:* Engineer-Mayor Lee Mingledorff of Savannah, Ga., (left) receives a citation from John Parr, chapter president; Mrs. Parr is in the foreground. *Center panel, top photo:* Leonard S. Hobbs, vice president in charge of engineering, United Aircraft Corporation, and Connecticut "Engineer of the Year," is pictured. *Lower photo:* Edward C. Ames reads Dr. James R. Killian's speech during the Toledo, Ohio banquet; the M. I. T. president was called home unexpectedly before the banquet because of illness in his family, thus necessitating the reading of the address he expected to deliver himself. *Last photo:* Another engineer-mayor, Raymond R. Tucker of St. Louis, Mo., signs the proclamation. Seated, l. and r., are W. P. Rathell and E. E. Carlson; standing l. to r., are J. A. Harvie, C. W. Schemm, R. L. Hanson, and J. T. Heard.**

CITATIONS, PROCLAMATIONS, DISPLAYS—***Upper left photo:*** **Hal E. McWethy (seated), executive secretary of the Minnesota SPE, inspects the outstanding service award presented to him by the MSPE. Looking on, l. to r., are: A. W. Tews, incoming president; W. Britzius, secretary; Dr. J. B. Calva, vice president; H. E. Olson, and James J. Ryan, retiring president.** ***Upper right photo:*** **This shows a window display sponsored by the Dresser Engineering Company in Tulsa, Okla., and featuring a model of a gasoline plant designed by the firm.**

Lower left photo: **Governor Edwin C. Johnson of Colorado signs a proclamation, while O. O. Phillips, H. A. Parks, George C. Hahn, and Adolph Zulian (seated) watch, l. to r.** ***Lower right photo:*** **Mayor L. A. Robinson (right) of Texas City, Tex., presents his Engineers' Week proclamation to A. W. Guill, president of the Galveston County Chapter.**

Reading Chapter members spoke in schools throughout the area. . . . The Susquehanna Chapter reported displays and extensive newspaper and radio coverage. . . . The Harrisburg P.E.'s set something of a record in getting the cooperation of 27 engineering firms and 39 area high schools for the observance. . . . Mayors Clifford L. Harman of Williamsport, Andrew J. Jakomas of McKeesport, and David L. Lawrence of Pittsburgh were also among the officials issuing special statements. In the latter city a local magazine—*The Pittsburgher*—carried a special article on professional engineering by R. M. Jenkins, and a kick-off "Mardi Gras" ball was held. . . .

In the Middle West, too, there was much enthusiasm for the Week. . . . Governor Frank R. Lausche proclaimed it in Ohio. . . . Cleveland engineers presented a special television program on the profession with Homer T. Borton representing the Cleveland SPE. . . . A TV interview with R. Hanes, OSPE president-elect, and Frank Williams, Franklin County Chapter president, was sponsored by the latter group. . . . The Southwestern Chapter of the Indiana Society reported excellent newspaper coverage in the Evansville area. . . . In Fort Wayne a 30-minute Sunday afternoon TV program featured the appearance of the Mayor and representatives from leading local industries, as paying tribute to the profession. . . . The Ladies' Auxiliary in Lansing, Mich., presented an Engineers' Week award to Clyde Hyde, a senior engineering student at Michigan State College. . . .

Problem Solvers

"We have great respect for the engineers. They are to the physical world what the men of the cloth are to the spiritual. . . .

"Civilization, in a sense, has had to wait on the development of the engineer's mental resources for a solution to all its big economic problems."

—Beckley Post-Herald
Beckley, W. Va.

The Rock River Chapter of the Illinois SPE sponsored a tour of leading Dixon, Ill. industries for local high school boys. . . . The Central Illinois P.E.'s arranged a joint meeting with local electrical engineers. . . . In Minnesota, where NSPE President Shoch attended the annual meeting during the Week, the *Duluth News Tribune* and the *St. Paul Pioneer Press* ran special feature stories on engineering. . . . An exhibit of engineering books and periodicals was featured in the Public Library of Hibbing, Minn., under Arrowhead Chapter sponsorship.

Wisconsin's Governor Kohler extended his official greetings to the profession in a special letter. . . . The Western Chapter sponsored poster displays and radio programs in the LaCrosse area. . . . The Fox River Valley Chapter sponsored a banquet in Appleton at which NSPE Vice President Virgil Gunlock was the principal speaker. . . . The Southwest Chapter of the WSPE arranged an impressive number of

telecasts, including a discussion of job opportunities in engineering. . . . The Northwest Chapter of the WSPE and The Eau Claire Technical Society cooperated in providing speakers for various area service clubs. . . . University of Wisconsin Dean of Engineering Kurt F. Wendt spoke at the respective banquets of both Northwest and Southwest Chapters, taking the Engineers' Week theme as his subject. . . . Everett S. Lee, manager of technical public relations for General Electric, was guest speaker at the Milwaukee Chapter's dinner.

Speakers from the Ozark Chapter of the Missouri SPE addressed luncheon meetings of various Springfield businessmen's clubs, and representatives also spoke in the area schools. . . . The Southwest Chapter, MSPE, blanketed an eleven-county area with Engineers' Week posters and displays. . . . As a result of the Engineers' Week program in the St. Joseph, Mo. area, the president of the local Chamber of Commerce asked the Northwest Chapter to appoint a special Engineering Committee as an advisory group for the Chamber. . . .

Quoting Mr. Dexheimer

"The contributions of the entire engineering profession to the advancement of civilization have been such that it is difficult to visualize progress in the world without a man with a slipstick in his pocket up somewhere near the front."

—W. A. Dexheimer
Commissioner of Reclamation

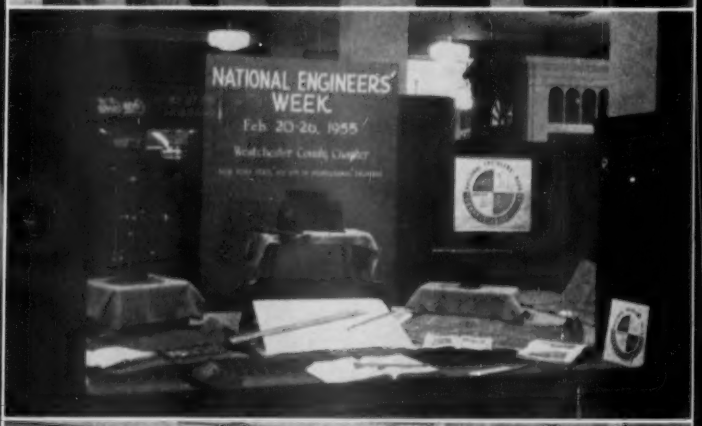
Mayor Clark T. Tucker of Kansas City, Kan., proclaimed the Week at the behest of the Eastern Chapter of the Kansas Engineering Society, and a TV panel program on Kansas water resources was another highlight. . . . The Topeka Chapter received an official proclamation from Mayor G. G. Schnellbacher, and also sponsored an outstanding banquet meeting. . . . The Wichita Chapter was another group that played host to President Shoch for an Engineers' Week address. . . .

The Oklahoma Society's annual meeting was held coincidental with the Engineers' Week celebration in Oklahoma City. . . . In Tulsa, a

(*Continued on page* 35)

MORE HIGHLIGHTS—*First column, top photo:* Looking over the Chicago proclamation are, l. to r.: Public Works Commissioner George L. DeMent, Chicago Chapter President Harold Sommerschield, Mayor Martin H. Kennelly, NSPE Executive Director Paul H. Robbins, and NSPE Vice President V. E. Gunlock. *Second photo:* Mayor A. J. Celebrezze (seated) of Cleveland signs the proclamation, watched by B. B. Farmer, J. R. McKinney, Leon D. Cleverly, and Homer T. Borton, chapter president. *Third photo:* This shows the head table at the Connecticut banquet arranged under Fairfield County Chapter auspices in Bridgeport. L. to r. are: Mayor Jasper McLevy, Col. J. D. Skinner, Mrs. Leonard S. Hobbs, Mr. Hobbs, Mrs. E. J. Nesbitt, Mr. Nesbitt—CSPE president, Mrs. A. A. Coronato, Mr. Coronato, Miss M. T. Leary—winner of the auxiliary's $150 scholarship award, Clarence Wiley, Mrs. Wiley—auxiliary pres., Mr. Ernest Mortensen—Fairfield pres., and Mrs. Mortensen.

***Second column, top photo:* President Clarence T. Shoch (third from left) arriving at the Wichita airport with W. F. Ryan (fourth from left), is greeted by C. L. Trapp, L. R. King, O. W. Daniels, Wichita president, and Ray S. Delamater, l. to r. *Second photo:* This shows a display sponsored by the Westchester County Chapter of the NYSSPE in one of the local stores. *Third photo:* Mayor Robert Wagner of New York City (third from left), presents a proclamation to the presidents of the area chapters. L. to r. are: R. J. Reddy, Richmond Chapter; G. C. Beck, Queens; Mr. Wagner; Otto Mald, Bronx; A. A. Vioni, Kings County; and H. H. Funk, New York.**



With Our Members . . .

Oklahoma News

Annual Meeting Is Highlighted By Outstanding Speeches, Inspection Trips

The annual meeting of the Oklahoma Society of Professional Engineers, held at the Skirvin Hotel in Oklahoma City late in February, was highlighted by a number of outstanding addresses by professional leaders, including NSPE President Shoch who spoke on the subject, *The National Society Fills a Void.*

Others who addressed the OSPE members included NSPE Vice President Robert J. Rinehart, W. A. Roberts, president of the Allis-Chalmers Company of Milwaukee, Governor Raymond Gary of Oklahoma, and Joseph Leopold, a well-known Dallas, Texas attorney. A major speech was also given by the State Society's incoming president, W. F. Hildebrand, who accepted the gavel from outgoing President Floyd Zook at the concluding banquet.

In addition to the usual business and professional sessions, the members and guests who attended were also afforded the opportunity to inspect the new State test highway, which had just been completed, the first independent color TV transmitter in the country—WKY-TV, and the Southwest Bell Telephone Company's local operation.

State Senator Speaks At California Meeting

The Hon. James A. Cobey, California State Senator, representing Merced and Madera Counties, was the guest speaker at a recent meeting of the Stanislaus Chapter of the California SPE. Senator Cobey discussed the current California legislative program as it affects the engineering profession.

The meeting was held at the Tioga Hotel in Merced. Douglas T. Robertson was in general charge of arrangements, working in cooperation with Merrill L. Adams, program chairman.

Community Responsibility Is Lecture Topic

The Engineer's Place in the Community was the subject of a lecture delivered at a recent meeting of the Engineers' Club of Jefferson City, an affiliate of the Missouri SPE. The speaker for the occasion was Carl J. Chappel, district engineer for the Portland Cement Association.

Joint Dinner Meeting For Two Pa. Chapters

March 5th was the date of a joint dinner meeting at the Kaufman Hotel in Zelienople, Pennsylvania, for the members of the Midwestern and Beaver County Chapters of the PSPE. Robert F. Miller, president of the Pennsylvania Society and a consulting engineer to a number of Schuylkill County municipalities and industries, was the guest speaker for the event.

Lorain County Banquet Guests

Photographed at the speakers' table during a recent dinner-dance sponsored by the Lorain County Chapter of the Ohio SPE are, l. to r.: Mrs. Charles Lawson and Mr. Lawson, who presented the travelogue program; Mrs. Stanley H. Young; Mr. Young; Donald E. Kropp, chapter president; Mrs. Kropp; Ray Hollis, and Mrs. Hollis.

Shoch Attends Minnesota Meeting

NSPE President Clarence T. Shoch was a guest of the Minnesota Society of Professional Engineers at the group's recent annual meeting which was held during Engineers' Week in conjunction with the 1955 Convention of the Minnesota Federation of Engineering Societies. President Shoch was also one of the major speakers of the meeting, addressing the MSPE members on the subject, *Statesmanship in Engineering*, during a luncheon presided over by James J. Ryan, president of the State Society.

Another highlight of the meeting was a panel discussion on the problems of the young engineer. Professor E. W. Carlton of the Missouri School of Mines, chairman of NSPE's Young Engineers Committee, served as moderator for the panel. Participants and their subjects were: Robert Jarvis—*The Need for Professional Guidance before Graduation;* John M. McKenzie—*What Industry Expects of the Young Engineer;* Hibbert M. Hill—*Professional Integration after Graduation;* and Sidney L. Stolte—*The Development of the Ability to Get Along With People.*

Bexar Chapter Honors Past Presidents

In recognition of the fact that its continuing success as a professional organization rests, in large part, on the cumulative contributions of its presidents, the Bexar Chapter of the Texas SPE recently held a meeting to honor the group's past presidents. Special certificates of award were presented to the honored guests.

Those receiving this recognition were J. W. Beretta, Jack Ririe, Irvin A. Uhr, Frank Corey, Manfred Gerhart, R. A. Thompson, Jr., Frank T. Drought, Delbert Ward, Glenn C. Hunt, J. L. Dickson, Dan W. Campbell, R. M. Shipman, and Frank S. Maddox.

Seattle Engineers Attend Dinner Meeting

The March meeting of the Seattle Chapter of the Washington Society of Professional Engineers was held in conjunction with the Puget Sound Engineering Council's Annual Dinner on March 10. The feature of the evening was a program on *Engineers in the Aeroplane Industry* which was sponsored by the Institute of Aeronautical Sciences.

. . . more news on page 37

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Alphabetized by States . . .

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Restricted to Registered Professional Engineers . . . Directory Continued on Next Page

Engineers' Week

(*Continued from page* 32)

week-long program was scheduled with water resources development as its basic theme; Brigadier General Herbert D. Vogel, chairman of the board of TVA, was one of the main visiting speakers. . . . Eight representatives from the Payne County Chapter gave as many talks in various communities. . . .

Special editorial and photographic tributes in the *Sandia Lab News* were reported from Albuquerque, New Mexico. . . . The first annual Engineers' Week banquet sponsored by the Arizona SPE at the Hotel Westward Ho in Phoenix, at which Vic H. Housholder was named Engineer of the Year, was a particularly outstanding event attended by Governor McFarland, Mayor F. G. Murphy, and Reclamation Commissioner W. A. Dexheimer. . . .

In Texas, where Governor Shivers proclaimed the Week, one of the most extensive programs was sponsored by the Galveston County Chapter. Its most unique feature was the presentation of an award to the top math student in each high school in the County. . . . J. R. Ramey of Sulphur Springs and Harry Glidden of Denison were two of the many Texas mayors issuing proclamations, the latter having been written at the request of the Northeast Chapter. . . . Willard Simpson, Sr., was named Engineer of the Year by the Bexar Chapter, while Dr. Eugene Paul Schoch, Sr., was similarly honored by the Travis Chapter. . . . The Piney Woods Chapter sponsored numerous radio programs, in addition to the special supplement to *The Lufkin Daily News*. . . . W. R. Woolrich was the featured speaker at the Sabine Chapter's Engineers' Week banquet in Beaumont. . . .

In California, representatives of the Stanislaus Chapter spoke before various business organizations in Modesto. . . . The Bay Area Chapters and cooperating technical societies selected O. G. Villard, Jr., as the Engineer of the Year for that district and heard Jesse E. Hobson, director of the Stanford Research Institute, speak at the award banquet. . . . The members of the speakers' bureau of the Fresno Chapter did yeoman service. . . .

Similar activities were organized in many other localities, thus familiarizing the general public with the scope and responsibility of the engineering profession and spotlighting the tremendous significance summed up in the Week's key slogan, "Engineering —Builder of a Brighter Future."

(Editor's Note: **If it had been possible, we would have liked to hold this story from the presses even longer for the late-arriving accounts of Engineers' Week accomplishments. Unfortunately, deadline day came far too soon, but those reports and photographs which we could not spotlight in this story are still going to prove invaluable to the National Engineers' Week Committee in developing plans for the 1956 observance, and in preparing general reports on Society activities.)**

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—The Arizona Republic
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Georgia Winter Meeting

Paul H. Robbins, executive director of the National Society of Professional Engineers, was the main speaker at the annual winter meeting of the Georgia SPE, which was held at the Dinkler Plaza Hotel in Atlanta on February 26th. In his address, which was delivered at the annual banquet, he called for a better utilization of American engineering talent as a means of offsetting the progress of the Soviet Union in developing tremendous numbers of trained technologists.

Another feature of the meeting was an address by Paul Weir, general manager of the Atlanta Water Works. And a panel discussion on Georgia's Water Control Policy, in which Benjamin M. Hall, Jr., Garland Peyton, H. H. White, Brigadier General Charles G. Holle, R. Graham Waitt, and C. D. Chapman participated, with Robert E. Stiemke as moderator, also provoked considerable interest.

John W. Lovell, president of the GSPE, presided at the various business and professional sessions.

Among other actions, the board of directors unanimously approved a resolution of the Society's Legislative Committee, urging continued promotion of a bill to reactivate the State Engineers Advisory Board.

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NSPE House Testimony Covers Reserve Plan

The following testimony was given recently before the House Committee on the Armed Services by Paul H. Robbins, Executive Director of the NSPE. —*Editor.*

. . . We are concerned with the problem before this Committee particularly as it affects the relationship of the professional engineers of the nation to the total national defense. While our special competence in this field relates to the contribution of the nation's professional engineers to national defense, we have consistently maintained a Society policy, and repeat it now, that "the total welfare and security of the United States, and not the best interest of any group or individual is the basic consideration for all questions to be resolved. . . . The objective of the engineering profession in time of national stress must be the development of the means to provide a maximum contribution to the military strength of the nation, and the maximum production to support that strength."

The basic facts regarding the nature of modern defense as related to the technology of today and tomorrow are unquestioned. The President of the United States, the Congress and every national leader who has publicly spoken on this point agree that modern techniques of defense require an increasing number of highly competent and trained scientists and engineers, both in the active military service and in the production arsenals which develop and build the modern weapons. In addition, all recognize that continued basic and applied research of increasing complexity is vital to continued strength in our total defense picture. It is also well accepted that the demands of present-day technology require a continued flow of trained students from our universities and colleges.

We do not consider it necessary to labor these points or prove them to the Committee. The only real question is how these basic concepts can be implemented in the best manner to insure the desired results. The basic problem, as we see it, involves three primary considerations:

1. The Training of Scientists and Engineers for An Indefinite Period.
2. The Continuation of Advanced Research.
3. The Maintenance of Adequate Scientific and Engineering Personnel in Defense-Related Industry.

A Continued Flow of Engineering and Science Students

It is our understanding that the National Reserve Plan will continue the present student deferment program and we commend this feature of it. It is important that under such a program those who possess the necessary aptitude and qualifications be permitted to pursue engineering or scientific study and to continue that study to its completion.

We trust that the virtual closing down of engineering and scientific education that occurred during World War II will not occur again. A heavy price has been paid in the loss of a continued flow of trained scientists and engineers. Other countries avoided this loss. We see no special problems in continuing the student deferment program during the foreseeable period of the future which our leaders tell us may be one of "cold war" or long-range periods of tension with possible occasional limited armed clashes. However, in the event that the United States is again forced into a major conflict we may anticipate that there will be renewed demands for "service for all," without regard to the importance of continuing special studies. There may be much emotional appeal in the doctrine of "equality of sacrifice," but our national self-interest requires a firm insistence by the Congress that steps be taken to maintain a steady flow of those trained persons who are indispensable in the development and production of the highly complex weapons of defense.

The Importance of Basic and Applied Research

In developing the strongest possible national defense system in this age of technology, additional consideration needs to be given to the value of basic and applied research. There is no disagreement about its importance and it is well recognized that without such research operations our progress in weapons development and industrial production techniques would come to a halt. Obviously, we cannot afford this when our potential enemies are bending every effort to outdo us in faster and more powerful airplanes, weapons with greater firepower, guided missiles, atomic devices, better communication systems, and a myriad of other organs of war.

The continued progress we must have is dependent in large measure upon the amount of time and effort we expend in our research, both basic and applied. We have been warned by various experts that we cannot expect to go on much longer using up the basic research learned in years past without replenishing our supply of scientific knowledge which others will use in the years to come as a basis for important new developments of a practical nature. It may be difficult for some to see the relative contribution of the scientist or engineer in the laboratory or scientific library, looking for fundamental physical facts when others

(*Continued on page 40*)

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STRICTLY BUSINESS

Personalities . . . Alexander H. Kuhnel of Bloomfield, N. J., has been named assistant manager of **The Austin Company's** Special Devices Division in New York City, where he will also continue to serve in the capacity of division engineer. . . . The appointment of **Harold C. Jenseth** as plant manager of the Plainville, Conn. plant of the **General Electric Company's** Distribution Assemblies Department has been announced by **C. K. Skinner,** manager-manufacturing. . . . The firm of **Seelye Stevenson Value & Knecht,** New York City consulting engineers, has announced the admission to partnership of **Gilbert D. Fish, A. Roger Kelly, Erik B. J. Roos, Stephen D. Teetor,** and **Harold S. Woodward.** . . . **Douglas C. Lynch,** formerly executive vice president of **Brush Electronics Company,** Cleveland, has been named president of the firm. . . . **Tracy Cowen** has been appointed assistant general manager and **Dr. Alex Sacher** has been named technical director of **Standard Insulation Company,** East Rutherford, N. J., according to **Lewis C. Kleinhans,** president and general manager. . . . **L. G. Diebel** has become chief engineer of the **Robinson Clay Product Company** of Akron, O.

Mr. Kuhnel

Joy Manufacturing Company, Pittsburgh, Pa., has announced the election of **Louis G. Helmick, Jr.,** as vice president of manufacturing. . . . The Akron, O. firm of **Smith and Scherr, Designers,** has announced that **Bernard A. McDermott** has joined the organization as a full partner and that the firm will now be known as **Smith, Scherr, and McDermott, Designers.** . . . **Bradlee Pruden** has been elected vice president in charge of engineering at **Ric-wiL, Incorporated,** Barberton, O., suppliers of insulated piping systems. . . . **Edwin F. Shelley,** chief engineer since 1951, has now been named vice president of the **Bulova Research and Development Laboratories, Inc.,** Flushing, N. Y., according to **General Omar N. Bradley,** chairman of the board. . . . **Jerome Wilkenfeld** has been promoted to assistant technical superintendent at **Hooker Electrochemical Company's** Niagara Falls, N. Y., plant. . . . **Robert L. Jenkins,** a member of the Dodge engineering staff, has been promoted to quality manager, according to **M. C. Patterson,** general works manager of the **Dodge Division** of the **Chrysler Corporation.**

Mr. Pruden

Kaiser Steel Corporation, Oakland, Calif., has announced the appointments of **B. J. Osborne** as assistant to the vice president and general manager, **Jack L. Ashby; William H. Kinney** as resident metallurgical engineer; and **S. Charles Knight** as general traffic manager. . . . **Theodore Z. Herr** has been appointed chief engineer of the **American Welding & Manufacturing Co.,** Warren, O., according to **William J. Sampson,** president. . . . The **Portland Cement Association,** Chicago, has announced the appointments of the following district engineers: **Harold G. Garner,** Kansas City, Mo. office; **Kenneth B. Lucas,** Omaha, Neb. office; and **Thomas D. Shiels,** Austin, Tex. office. . . . Changes in its plant management staff and engineering department have been announced by **Line Material Company,** Milwaukee: **T. J. Andersen** has been appointed general manager of **Illinois Electric Company,** Macomb, Ill., a **McGraw Electric Company** subsidiary operated by **L-M; J. G. Everhart** is now plant manager of **L-M's** fibre products plant, Sherman, Tex.; **R. P. Thompson** is the new chief engineer, and **M. I. Zwelling** is assistant chief engineer at **L-M's** Zanesville, O. transformer plant.

Mr. Herr

New firm . . . **Clifford Reuther & Associates, Consulting Engineers—Land Surveyors,** have announced the opening of offices at 56 Broad Street, Milford, Conn. The firm will offer a variety of services, including estimating, evaluations, construction, municipal work, property surveys, sub-division work and drainage design.

Reorganizations and Changes . . . **Whitman, Requardt and Associates,** Baltimore consulting engineers, have consolidated their offices, previously at four different locations, to offices in two locations—one in the Loyola Federal Building, 2 West Preston St., Baltimore 1; and the other at 1304 St. Paul St., Baltimore 2. The latter location is the headquarters office. . . . The **Barry Corporation,** Watertown, Mass., has announced that, in keeping with its expanding product line, it is changing its name to a more accurately descriptive title—**Barry Controls, Incorporated.** . . . The **Blaw-Knox Company's** Parts and Services Department, of which **C. W. McIntyre** is the newly-appointed manager, presently located at Springdale, Pa., will be moved to Mattoon, Ill., in late 1955, according to **Robert P. McKenrick,** vice president and general manager of the Pittsburgh firm's new Construction Equipment Division. . . . **International Resistance Company** of Philadelphia has announced that its wholly-owned St. Petersburg, Florida subsidiary, formerly **Van Dyke Instruments, Inc.,** will now be known as **Circuit Instruments, Inc.** . . . **Robert S. Curl & Associates,** designing, consulting, mechanical, and electrical engineers of Columbus, O., have announced the moving of their offices to the Curl Building at 1309 East Broad Street.

Exhibitions . . . **Keystone Engineering Enterprises** of Fort Worth and Dallas, Tex., has announced the **First International Aircraft Mart Exposition** to be held May 3-5 at Will Rogers Memorial Coliseum in Fort Worth.

Testimony

(Continued from page 38)

are required to endure the rigors of military life and be exposed to possible injury or death on a battlefield. But our very hope of survival depends in large measure on our making possible, within the framework of national policy, the continuing work of those who are searching for new facts, new techniques and new methods. This is the forerunner of progress in all fields of physical advancement and particularly so in national defense development.

It has become increasingly clear within recent months that there is an insufficient appreciation in some quarters of these fundamental points. The student deferment program permits a further deferment after completion of undergraduate work in order that qualified students might continue their study for graduate degrees and research. But in the administration of this authority there has been a trend toward denial of its full utilization. It has come to our attention that some local draft boards have taken the position that a further deferment for graduate study is not warranted, or that "an undergraduate degree is enough." This same trend has occurred to some degree at the national level. Executive Order No. 10562, dated September 20, 1954, raised the standards for entry into graduate work after January 1, 1955, to require that the student must either be in the upper one-fourth of his class in his last undergraduate year or attain a score of 80 on the qualification test prescribed by Selective Service regulations, contrasted with the previous criteria of the upper one-half of the class or a mark of 75 on the qualification test. The White House announcement said that this revision was to insure that students who are deferred for graduate work "possess fully acceptable scholastic qualifications whose development could benefit both the Nation and the individual." But the Director of Selective Service, in commenting upon the Executive Order, clearly indicated that the purpose of the change was to reduce the number eligible for graduate study deferments.

The "tightening up" on deferments for graduate study is cited only as a part of the existing pattern which militates against graduate study instead of encouraging it by every reasonable means. Our national policy should be to encourage graduate study and we suggest to the Committee that it use its influence, to the extent possible, to indicate its support of this principle we have enunciated. Specifically, it would be very helpful if the Committee would announce its agreement with the policy of additional deferments for graduate study so that expression of influential opinion could be disseminated to local and state selective service boards.

We do not urge exemption of those in graduate study, but we do submit that extended deferment is desirable in the interests of national security so long as the graduate student is satisfactorily pursuing a course of graduate study or research which has a practical relationship to the physical facts of modern technology and, thereby, modern national defense.

We have noted with satisfaction the establishment of engineering and scientific advisory boards to the state selective service operations and believe that the extension of such advisory groups to all of the states will be of immense assistance in the determination of deferments for undergraduate and graduate study in the engineering field.

Maintaining the Supply of Engineers in Defense-Related Industry

In our judgment the most serious, and perhaps most difficult, problem in balancing military needs for manpower and specialized technical manpower requirements of industry, which must turn out the sinews of modern defense, is the proper relationship with regard to specialized personnel in the military reserve organization and who may be essential to industrial development and production. Under the National Reserve Plan we may anticipate that in the future many, or perhaps most, of the essential technical personnel in industry may be subject to recall to active military duty as part of the Ready or Standby Reserve.

We appreciate that the recall of those in the Standby Reserve will be under the jurisdiction of the Selective Service System. This makes it all the more important that the engineering and scientific advisory bodies be established as soon as possible in all states. The power of actual decision will still remain, however, with the local selective service boards. We feel that from the standpoint of national defense interest it is necessary to have some mechanism or procedure to establish and monitor basic national policies regarding the essential nature of certain engineering and scientific occupations. It is suggested that this can be accomplished without interfering with the basic principle of the National Reserve Plan that actual power of decision on recall of Standby reservists should remain in the local selective service boards. We propose that the pending legislation be amended to add a section establishing a National Engineering and Scientific Personnel Advisory Board, under civilian control, housed and administered in the Office of Defense Mobilization. That agency is ideally fitted to weigh total national defense considerations with its special responsibilities and knowledge in the field of defense-industry operations, stockpiles of essential materials, industrial dispersion, manpower supply and requirement, etc.

This Board should be composed of eminent persons in the engineering and scientific professions, including those experienced in industry, government, education and the armed forces. Its function should be to recommend basic national policies with respect to the proper balance between military, industrial and research needs of the Nation on an occupational and industry-by-industry basis. The recommended policies of the Board, when approved by the Director of the Office of Defense Mobilization, should be transmitted to the President for promulgation as national policies binding upon Selective Service and the military departments.

The incorporation of such a policy board in the National Reserve Plan legislation will do much to assure the engineering and scientific community and industry that proper high-level consideration will be given to the delicate, but essential, balance between the two kinds of related national defense activities—armed forces and development and production facilities.

With this important modification, we believe that the National Reserve Plan is as just and sound an approach to the national manpower problem as may be developed at this time under the present uncertain circumstances which prevail. Obviously, some of the problems cannot be appreciated fully at this stage, but the Plan does have the advantage of a reasonable degree of flexibility to permit improvements through administration and by Executive Order of the President.

It is wise, in our opinion, that the Plan be adopted for only a four-year period so that Congress may re-evaluate it at the end of that time and direct desirable improvements in the light of that experience and the prevailing world situation.

We appreciate this opportunity to appear before the Committee and express our sincere desire to be of any service or provide any information at our disposal which the Committee would desire.

New Jersey Society of Professional Engineers — Annual Meeting. April 22, 23, 1955. Essex House, Newark, New Jersey.

New York State Society of Professional Engineers—Annual Meeting. May 12-14, 1955. Commodore Hotel, New York, New York.

Indiana Society of Professional Engineers—Annual Meeting. May 14, 1955. Hotel Severin, Indianapolis, Indiana.

NSPE Annual Meeting — June 2-4, 1955. Bellevue-Stratford Hotel, Philadelphia, Pennsylvania.

Pennsylvania Society of Professional Engineers — Annual Meeting. June 2-4, 1955. Bellevue-Stratford Hotel, Philadelphia, Pennsylvania.

California Society of Professional Engineers — Annual Meeting. June 2-4, 1955. Statler Hotel, Los Angeles, California.

Michigan Society of Professional Engineers — Annual Meeting. June 9-11, 1955. Gratiot Inn, Port Huron, Michigan.

Georgia Society of Professional Engineers—Summer Meeting. June 17, 18, 1955. General Oglethorpe Hotel, Savannah, Georgia.

Letters

(Continued from page 4)

one who tends to some kind of an engine; and the word professional makes little or no change in that picture.

Now, there is no use of painting a complete picture of our past before an uninformed public but let us meet this situation and make sure that we change it and do improve it. It appears to me that the one answer to it is to take the designation "Doctor Engineer" as they have done in Germany for so many years.

It is not my personal desire to carry such designation, but it is my wish and hope that our profession be . . . recognized. I hold . . . the engineer will be best known by the general public when he is known as Dr. Eng. John Doe.

The engineer needs that left for the public and himself, and we will have a far greater number of young men to matriculate and strive for this profession. . . .

Z. C. Birnberg, P. E.,
Corpus Christi, Texas.

...NEW LITERATURE...

To help the offering firms determine which literature you require, when requesting an item, be sure to list all specifications shown . . . and say you saw it in the AMERICAN ENGINEER.

TRANSIT LEVEL—The Warren-Knight Company has just issued a new folder on its Model No. 38-bF transit level, describing operation, outstanding features and dollar value in their unit which operates like a transit yet has the exclusive advantage of being adjusted like a Wye Level. Features include 24x power internal focusing with coated optics, glass cross wire reticule, permanent fitted draw tube, focusing pinion with nylon bearings and larger eyepiece cap. For your copy of this informative folder write: Warren-Knight Company, 136 North 12th Street, Philadelphia 7, Pennsylvania.

—AE—

SUSPENDED CEILINGS—Four systems for suspended ceilings are described in the new Sanymetal Products Co. Catalog NSP-7. Planned so as to provide information engineers need most in designing suspended ceilings, the new catalog contains dimensional drawings, perspective drawings and installation photos of "Nailock," "Screwlock" and "Perf-A-Best" Systems. Also included are details on Utility Nailing Channel for light suspended ceilings. Address requests to The Sanymetal Products Co., Inc., Suspended Ceilings Division, 1701 Urbana Road, Cleveland 12, Ohio.

—AE—

LOWER SHORING COSTS—How to save as much as 20% to 40% in overall costs in shoring concrete forms, is fully described and illustrated in an informative 24-page brochure just released by Universal Manufacturing Corp. Based on experiences in shoring buildings, highway bridges and overpasses, filtration plants and other reinforced concrete structures. Explains and illustrates each job application with photos and layouts. Also shows how to effect additional savings in material, speed-up forming operations and eliminate unnecessary tearing-down an re-erecting shoring and forms. Copies from: Universal Manufacturing Corp., Zelienople 25, Pa.

G-E BULLETINS — *Instrument Transformer Buyer's Guide*, 1955 edition, fully illustrated, 100-pages, number GEC-1028. Contains ratings, ASA accuracy classifications, ratio and phase-angle tests, tables of replacement types, mechanical and thermal data, and prices of all Standard G-E indoor and outdoor potential and current transformers. *Metal-Clad Switchgear*, rates 2.4 KV to 13.8 KV and 50 to 500 MVA is comprehensively described in Bulletin GEA-5664C. Four-color 52-page publication includes detailed discussion of applications, installation, maintenance, advanced design features, accessories, etc. Includes tables of dimensions and weights, foundation data, and guide from specifications. *High-Voltage Circuit Breakers*—A new series of high-capacity steel-clad impulse oil circuit breakers in ratings of 138 KV, 161 KV, 230 KV and 330 KV are described in a new G-E bulletin, GEA-6157. Advantages of "Lens-shape," simplification of shipping, installation and maintenance, dimensions, accessories, and cross sections are covered in 16-pages. *Industrial Solenoids*, a four color, 16-page bulletin GEA-6215 describing the complete new line of G-E strongbox industrial solenoids contains information on product features, laboratory tests, and general application rules. A cross-reference chart equates this new line with corresponding models in the former line, and shows the proper model to be chosen for given requirements of force and stroke. Also shows force and current curves, and dimensions for both push and pull types. Request by title and number from General Electric Co., Schenectady 5, N. Y.

—AE—

NEW RIC-WIL CATALOG — Ric-wil, Inc., announces completion of their new 90 page catalog. Lists illustrations and specifications of Ric-wil insulated piping systems for underground or overhead use. Five separate sections make up the complete catalog. Each individual section has a tabbed, lead page of contents for quick, easy reference. Copies may be obtained by writing direct to: Ric-wil, Incorporated, Barberton, Ohio.

PLASTICS TOOLING—"A Manual for Reinforced Plastics Tooling," has been published by the Marblette Corporation. Illustrated with photographs, drawings, and diagrams, the 20-page handbook describes the fabrication and indicates the uses of such plastic tools as spotting racks, checking and inspection fixtures, welding and assembly fixtures, duplicate die models, drill and trimming fixtures, and matrices made from thermosetting resins—phenolics, polyesters, and particularly epoxies — strengthened with glass fibers. In proper time sequence, diagrams and text outline step-by-step laminating and framing processes. Request on company letterhead. Marblette Corp., 37-21 Thirtieth Street, Long Island City 1, N. Y.

—AE—

INDUSTRIAL PRODUCTS CATALOG —A new composite industrial products catalog, known as the Weatherhead "Yellow Book," has just been issued by the Weatherhead Co. Contains 132 pages, arranged for quick reference. Tabbed pages indicate separate sections covering Brass Tube Fittings, Drain and Shut-Off Cocks, SAE 37° Flare (JIC) Fittings, Ermeto Steel and Stainless Steel Fittings, Bulk Hose and Reusable Ends, and Hose Assemblies. The "Technical Data" Section includes pressure tables, tube bending instructions, correct procedures for making hose assemblies, hose end hex sizes, tubing safety factors, tube wall thickness tables, and other useful data. A section covering service tools and equipment is also included. The "Yellow Book" is available from The Weatherhead Company, 300 East 131st Street, Cleveland 8, Ohio.

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What's New

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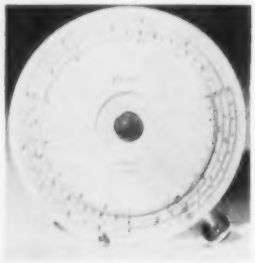
CIRCULAR SLIDE RULE — *Item 1*



A new circular slide rule has these outstanding features: Computations are made by simply dialing in the numbers with the cursor. Cursor is lockable. Scale division numbers face the operator as on a clock dial. Answer never runs off scale, and is always read at same stop position on "Answer Dial." Scales are identified on cursor and held to a minimum for a maximum of calculations. Average scale length is 17 inches. Division lines are on white faced metal, precision spaced and of precision fineness. Deci-trigonometric scales on back.

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TURN A DIAL, GET A COPY — *Item 2*

An improvement in photocopy equipment is now being marketed by American Photocopy Equipment Co. It is the new Apeco Dial-A-Matic Auto-Stat. Exclusive illuminated dial takes the guess work out of making copies. Setting the dial to match the type of original to be copied automatically produces a sharp, dry copy of anything written, printed, drawn or photographed. Only 24" long, 9" deep, 5" wide. Maximum paper width is 15 inches, any length. Self-adjusting developer rollers take any weight paper, from tissue to heavy card stock without manual adjustment.

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GRAB-ALL TOOL RETRIEVES AND HOLDS — *Item 3*

A retrieving and holding tool, known as the Proto Grab-All, has been announced by Plomb Tool Company, Los Angeles, Calif. Useful for retrieving all types of small non-metallic and metallic items from bath drains, sinks, toilets, garbage disposers, or other hard-to-reach places. Also handy for radio, TV and appliance repair work, for instrument board assembly, for grinding and precision work, for laboratory use.

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REFRIGERATION MOISTURE DETECTOR — *Item 4*

Breakdowns of refrigeration equipment caused by moisture in the system are minimized by a unique new device developed by Ansul Chemical Co., which performs the dual job of indicating when moisture is present in the system and then removing it. The Ansul Dry-Eye System, makes it possible to see and analyze at a glance, through a leak-proof window containing a special indicating element which changes color, the approximate moisture content of the refrigerant without shutting down the system. The Dry-Eye cartridge is available in a variety of sizes capable of handling house-hold-type refrigerators all the way up through the largest commercial units.

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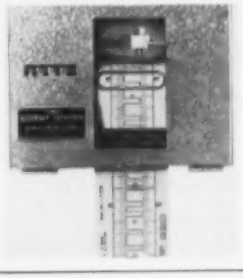
CONTINUOUS OPERATION RECORDER-TIMER — *Item 5*

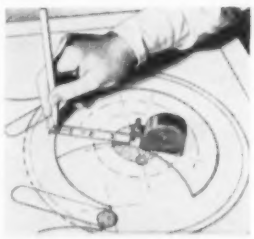


The Heat-Timer Corp., introduces the Time Recorder + Totalizer, which provides a continuous operation record of any electrically operated machine or process. Chronologically marked tape, from a large roll, continuously passes through this instrument recording the time and length of every "on," every "off" period of the equipment. A glance at tape gives all information about the operation of the machine or process being monitored. The Totalizer gives a total of the complete "on" time of the equipment.

This column describes new products of general interest to professional engineers. For further information, fill in the coupon provided and mail to the AMERICAN ENGINEER.

UNIQUE BEAM COMPASS RULE — *Item 6*

Now you can make big circles and large radius arcs up to 12 feet in diameter quickly and accurately with this unique beam compass rule imported from Sweden. Just lock tape to desired radius, press in center point, and draw with same pen or pencil used in the rest of the drawing—or cut leather, fabrics, thin metal with a sharp knife-point. Scribes on any material. Steel tape is calibrated down to 32nds. Center point is common thumbtack—retractable to prevent tearing pockets.



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CONDENSER FEATURES REVERSE AIR STREAM — *Item 7*

Niagara Blower Co. announces a new, 200-tons-refrigeration capacity ammonia Condenser featuring a reverse direction air stream that is a departure from previous practice and is a new, patented feature which is said to increase the capacity of the unit and reduce the outlay for electric power. Air stream enters at top of condensing section, is drawn downward thru water sprays, over condensing coils, and then turns upward to leave the unit thru propeller-type fans at top. Spray water is recirculated, with a net water consumption reported at less than 5% of the water used by submerged coil type condensers of equal capacity.

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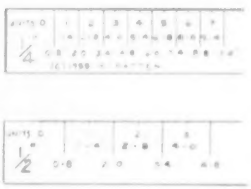
NEW SCALE FOR CONCRETE BLOCKS — *Item 8*

Recently copyrighted, the Patten Block Scale permits wall openings and corners drawn direct to even and half sixteen inch concrete block lengths. The estimator can also read direct the number of blocks along a wall from the plans without interpolation of feet to blocks. ⅛, ¼, and ½ inch scales. Dimension in feet and inches is given under the number of block units. Vertical readings are read by doubling the number of units.



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FOUR-IN-ONE RADIATION DETECTOR — *Item 9*

A new lightweight portable probe which selectively detects alpha-beta-gamma and thermal-neutron radiation has been developed by the GE Instrument Department. Features interchangeable heads for detecting different radiations, extremely high thermal neutron counting efficiency, and the ability to count alpha particles in the presence of high beta-gamma background. Scintillation caused by radiations is detected by a 5819 photomultiplier tube. The output is fed to a high-stability, cathode follower pre-amplifier which operates directly into almost any scaler. A standard connector allows connecting cable to be attached to the probe.

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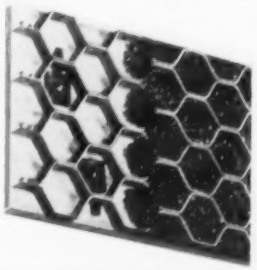
FLOOR ARMOR FOR RESURFACING — *Item 10*

New Hexteel safety floor armor has less weight per square foot and a greater exposed steel surface according to Klemp Metal Grating Corp. ⅜" x 16 gage (.065) Hexteel Surface Armor filled with a hot or cold mastic is ideal for resurfacing ramps, garages, factory aisles, runways, loading docks, depots, and wherever rough usage decreases the lasting durability of surface area of flooring. Forms a continuous steel floor armor which is said to eliminate cracking, swelling, warping and shrinking.



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Dr. H. C. Pollock (left) is holding a 70-Mev synchrotron "doughnut" designed and constructed in the G-E Research Laboratory. He joined General Electric in 1937, after receiving a B.A. from the Univ. of Va. (1933), and a Ph.D. from Oxford Univ. (1937). His research interests at G.E. have included a pioneer separation of U-235, submarine-detection devices, and counter-radar work, as well as studies in radiation physics.

More power to electrons

General Electric's Dr. Pollock combined the principles of two accelerators to produce high-energy electrons

The tools used by physicists to accelerate electrons up to the high energies needed for nuclear research are usually very large and heavy. Some years ago, Dr. Herbert C. Pollock of the General Electric Research Laboratory showed that by combining the actions of betatron and synchrotron, a smaller machine could be made to accelerate electrons. A successful 70-million electron volt synchrotron of this new type — using a magnet weighing 8 tons compared to 135 tons in a 100-Mev betatron — was designed and built by Dr. Pollock and other G-E scientists in 1947.

This was an important link in the chain of increasingly more powerful electron-accelerating machines which are now helping to extend the frontiers of nuclear physics and medicine. Synchrotrons which accelerate electrons up to 300 Mev and more have been constructed recently at Schenectady and elsewhere. Today, physicists are looking ahead to electron energies in excess of a billion electron volts.

Progress Is Our Most Important Product

GENERAL ELECTRIC